

MARINE REVIEW.

VOL. XVI.

CLEVELAND, O., JULY 8, 1897.

No. 2.

Lake Freight Situation.

The cutting off of coal shipments from Ohio ports by the strike at the Ohio and Pennsylvania mines has caused an unsettled feeling in the lake freight market. Although the strike has only been on for a few days no tonnage has been taken and a number of charters that were made last week have been cancelled as shippers are unable to furnish the cargoes. Nearly all the coarse freighters will have to go up light as Buffalo is sending very little coal forward and until the miners' strike is settled it will be almost useless to try to get a cargo at the Ohio ports. About all the spot ore boats have been cared for but offerings of tonnage are steadily increasing and it will be a hard matter to find cargoes for all the boats that will be ready to load next week unless there is a decided improvement in grain freights and that is not looked for. Boats are being placed at 50 cents from Lake Superior ports and 40 cents from Escanaba, the same rates that were paid last week. Shippers from ports at the head of Lake Superior are taking tonnage pretty freely, but at Marquette and Escanaba brokers are having trouble placing all the boats that are offered and it is not likely that matters will be any better until coal begins to move again. The condition of the ore docks at the receiving ports is such that the ore trade cannot take care of all the freighters running light and some of them may be forced to lay up. There is no telling how long the trouble at the mines will last but it is certain that the movement of coal will be very light this month as compared with June. While the dullness in coal freights is having a depressing effect in the ore trade

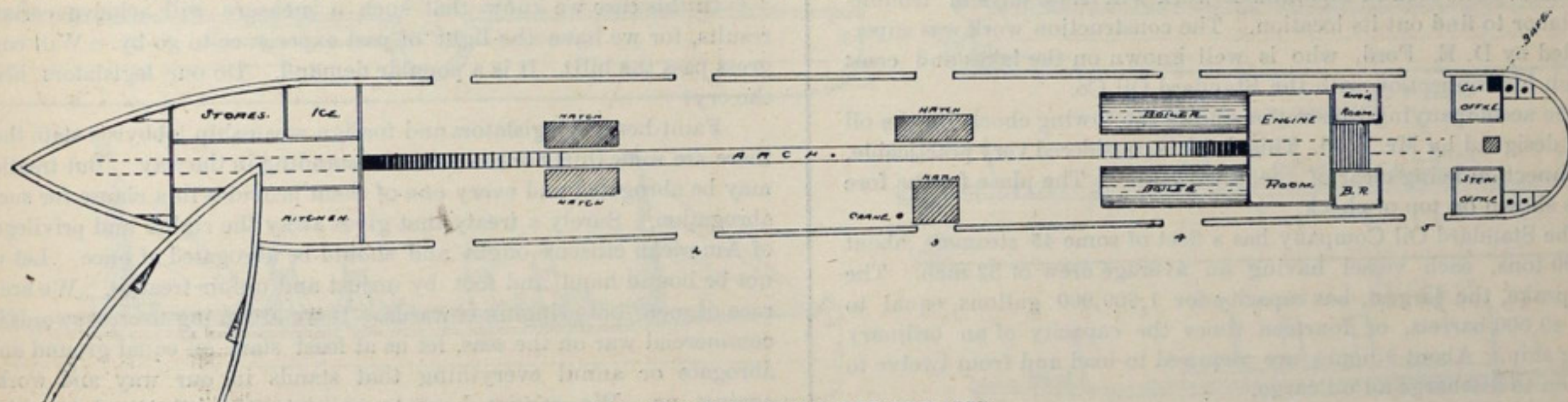
feet in diameter. It is no more like the old diving bell than day is like night. The constructors are careful that no one shall see the plans. It is made of one-inch steel, and the tube is arched on top. It is fitted with glass windows. Should they break there is an automatic attachment which will close immediately without allowing any water to enter the compartment. There are also a telephone and fresh and foul air pipes which connect with the surface. On the outside of the case there is an arc lamp, which enables those in the bell to see 100 feet under the water.

Attached to the cage and worked from the interior are several long automatic arms or legs. These, it is claimed, are used to move the machine about the bottom, or to manipulate any tool it is desired to use. They are also used for the lifting of weights.

If anything should get out of order the water ballast can be let out and the bell will come to the surface. The interior of the apparatus is lighted by incandescent lamps. The frame has been tested to withstand a water pressure at a depth of 1,156 feet, so that there is no danger of its collapsing at 160 feet.

The Conneaut Harbor Obstruction.

In response to complaints from a number of lake captains Geo. L. McCurdy, who is interested in making navigation safe as possible, wrote to Col. J. A. Smith, U. S. engineer in charge. His reply is as follows: "Your letter of June 22, 1897, comes duly to hand. I am quite well aware of the condition of the crib at Conneaut to which you



MAIN DECK PLAN OF THE PEWABIC.

now, it is sure to have the opposite effect as soon as the movement becomes heavy again. The coal has got to be sent forward and the longer it is delayed the greater the rush will be when a start is made and the ore men are not in shape to ship ore much faster than they have been for several weeks past.

There has been a little improvement in grain freights at Chicago and rates are a shade higher than they were at the opening of the week. The situation at Duluth is unchanged.

The Pewabic-Meteor Collision.

An item has been published in a few lake papers claiming that the safe of the Pewabic was looted and that she was run into the Meteor purposely to cover up the crime. It will cause a laugh when it is known that the clerk was in charge of the safe and would have had to propose the scheme to the captain, mate, lookout and wheelsman to make it effective. Geo. P. McKay was captain and Ed. Mooney mate, and this is the first intimation that they ever engaged in any piratical venture. The illustration herewith shows the main deck plan of the Pewabic. It was drawn from an outline furnished by Capt. McKay, as he remembered the vessel. A copy was sent Warden G. Smith, manager of the wrecking company, and inventor of the diving apparatus. No drawing of the apparatus has ever been given out by the inventor. But the description given below is said to be correct.

The diving bell used by Worden G. Smith in discovering the Pewabic is a cylindrically shaped steel tube, eight feet high and six

refer. It is a matter however, that cannot be attended to until further appropriations are made by congress. The crib stands upon solid rock where the depth of water is two or three feet less than the draft of the loaded steamers which enter the channel. Until funds are sufficient to remove the rock in the channel, it is therefore much better to leave the crib where it is because there is less danger to vessels when the crib is there than there would be were it removed because it serves as a beacon to keep them off the rock."

A New Chart of the Rivers.

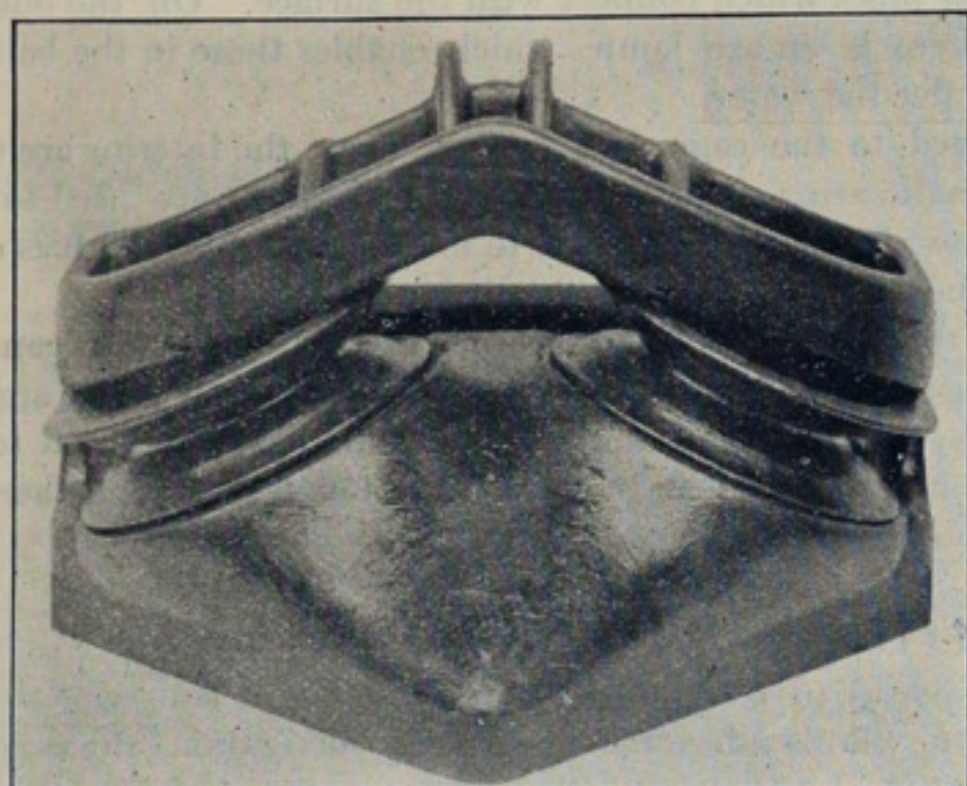
The Review has received from the Hydrographic office an excellent chart covering the rivers, channels, etc., from Lake Erie to Lake Huron in one sheet. On a larger scale the difficult portions of the rivers are reproduced on the same chart. Among these are St. Clair flats, entrance from Lake Huron, Stag island to St. Clair, Marine City approaches and Detroit to Grosse point. It is corrected to date and shows buoys not indicated on other charts. The price is \$1 and it can be obtained from the Marine Review.

The report that the gas buoy at Port Huron was a failure on account of the current canting it so it wouldn't burn is all nonsense. These buoys are in use all over the world, and in trade ways where the current is many times stronger than in the St. Clair river. It may not have been properly moored or anchored. But it will not be displaced by any light-ship for any length of time, at least.

Oil Barge No. 81.

Oil barge No. 81 which went into commission recently, was built by the Union Dry Dock Co., Buffalo, N. Y. The vessel is 260 feet over all, 254 feet on the keel, 40 feet beam and 23 feet deep. The boiler and pumps are forward, the foremast being used for a smoke stack. The vessel has two compound oil pumps, with a capacity of 120,000 gallons per hour, and the ballast pump has 70,000 gallons capacity. A fire pump is also carried.

The American Ship Windlass Co's towing machine, windlass and steam capstans are used. The double bottom is divided up the same as the oil compartments, the tank top running from well to well. The ship's side and bulkheads are strongly braced, which shows the



care which must be taken in putting the work together to secure oil tight work. One leak in this kind of work will cause days of troublesome labor to find out its location. The construction work was superintended by D. E. Ford, who is well known on the lakes and coast through his connection with the Standard Oil Co.

The accompanying illustration shows the towing chock, on the oil barge, designed by Mr. Ford. This chock is considered very practicable, the connection being clear of the towing line. The place for the fore stay is shown on top of chock.

The Standard Oil Company has a fleet of some 45 steamers, about 120,000 tons, each vessel having an average crew of 32 men. The Chesapeake, the largest, has capacity for 1,600,000 gallons, equal to about 40,000 barrels, or fourteen times the capacity of an ordinary sailing ship. About 9 hours are required to load and from twelve to fourteen to discharge an oil cargo.

What the American Merchant Marine Needs.

The deplorable condition of the American merchant marine in over-sea trade has long called for some measures of relief that will restore our country's flag to the seas. The people of the United States pay annually over 200,000,000 of dollars in gold to foreigners for transporting passengers and freight between the United States and Europe, all of which goes into foreign pockets and is a constant drain on the wealth of the United States. We are entirely dependent upon foreign ships to carry on our business with foreign nations. Is it not a most humiliating position for a great nation? Our commercial sea power has disappeared through our own stupidity and neglect, for while England, France and Germany have been encouraging their merchant marines, the United States has done practically nothing to help American ships to keep the seas.

Almost every industry in this land has, at one time or another, had its share of protection. Our ship building has been protected by prohibiting Americans from purchasing foreign-built ships. If an American wants a vessel and wishes to sail it under the American flag, he must patronize home industry. This is undoubtedly right. But protection to the ship builder does not in any way protect the ship owner, for the American ship owner must operate his vessels in open competition with vessels sailing under the flags of other nations. These same foreign nations paying to their ship owners bounties, subsidies, naval reserve subventions, etc., is it any wonder that American ships have been driven from the seas. Our shipping in the coastwise trade has been absolutely protected by prohibiting foreign vessels engaging in it, no vessel sailing under a foreign flag being per-

mitted to transport passengers or cargo from port to port in the United States. This wise plan of protection, inaugurated by the first congress, has built up a coastwise trade, of which 100 per cent. is carried in American vessels. American ships engaged in over-sea trade can almost be counted on one's finger tips, and average about 4 per cent. of the total shipping entering and clearing from our seaports. At one time in the past our clippers carried the fame of American ship builders to every country on the globe, and we carried 90 per cent. of our foreign commerce. How great has been our downfall!

American steamships have been driven from the seas by mail subsidies paid to foreign steamship companies by foreign governments. Besides mail subsidies, foreigners pay tonnage bounties and naval reserve subventions. How can Americans hope to operate ships against such odds? True, we now have four ships sailing under the American flag to Southampton, two of which are the products of English ship yards. This is the only trans-Atlantic line under the stars and stripes, and was called into existence by a small mail subsidy. An American tramp steamer is unheard of, while our harbors teem with tramp steamers of every nation but our own.

There is no hope that Americans can ever regain their share of the world's carrying trade, unless congress comes to the aid of American ship owners. The question is how can we best regain this trade. There is now a bill before congress, presented by Senator Elkins, providing a system of discriminating duties favorable to American built, owned and manned ships, which provides that goods and merchandise imported into this country in foreign vessels shall pay an additional duty of 10 per cent. over and above goods imported in American vessels. This is the same system of discrimination enacted by the first congress and signed by George Washington as president, that wrested the control of American commerce from the hands of foreigners and built up our shipping until we carried 90 per cent. of our imports and exports.

In this case we know that such a measure will achieve certain results, for we have the light of past experience to go by. Will congress pass the bill? It is a popular demand. Do our legislators hear the cry?

Faint-hearted legislators and foreign steamship lobbyists state that there are some thirty or more treaties standing in the way. But treaties may be abrogated and every one of them provides in a clause for such abrogation. Surely a treaty that gives away the rights and privileges of American citizens ought and should be abrogated at once. Let us not be bound hand and foot by unjust and unfair treaties. We are a race of men, not cringing cowards. If we are going to cross swords in commercial war on the seas, let us at least start on equal ground and abrogate or annul everything that stands in our way and works against us. We cannot hope to compete with subsidized, bountied shipping and foreign pauper labor protected by unjust treaties which prevent Americans from legislating in their own interests. Such a bill as Senator Elkins has introduced would immediately enlarge the revenues of the government, would rebuild the merchant marine in American ship yards, would save a large part of the \$200,000,000 now paid to foreigners for transportation and would help to restore prosperity by giving employment to our people. The Elkins bill would do away with the necessity for subsidies and bounties and would cover every class of vessels from the smallest schooner to the largest steamship.

As Americans have been compelled to operate their ships under foreign flags, it might, perhaps, be well to permit ships now owned by Americans sailing under foreign flags, to come under American registry when a discriminating duty bill goes in force.

The Elkins bill should pass on its merits. It is a just measure and one sadly needed at this time, when our industries languish and American labor clamors for bread. It is not a partisan bill. It is based on the purest patriotism and is for the good of our country. Let us have American ships for American commerce and restore our flag to the seas. Let congress do its duty and pass the bill. Great opposition from foreign steamship companies must be looked for, but congress has the demand for the bill from the people. Let us have our rights.

Richard Joy.

Detroit, Mich., July 3, 1897.

Excursion to Chautauqua July 11th and 12th at one fare via the Nickel Plate road acconut photographers' convention at Celeron.

Ship Yard Work.

Notwithstanding low freights and generally bad conditions some lake ship yards are getting a few contracts. It is understood that figures are being asked for on a large steel barge. The building of another steamer by the Union Dry Dock Company, Buffalo, and the contract for an usually large steel tug taken by Wheeler & Co. at West Bay City, give promise of some activity in lake yards. The tug is to be 156 feet long, 11 feet longer than the tug recently contracted for New Orleans parties. It will be used in the coast trade about the Gulf of Mexico, and will be constructed sufficiently strong to cross the Atlantic when desired. The measurements of the new boat will make it the largest in the world, with the Wilmot tug the second in size. It is to be built for Pittsburg parties.

The Union Dry Dock contract is probably for the Union Steamboat Co., although Supt. Gaskin will not give out any information concerning it. This makes three lake ship yards busy, the Globe Iron

which he is not a believer, but by deepening the channels in the old way—by dredging and blasting rocks. He gives his reasons for it in a Detroit Free Press interview:

Damming the Niagara may have some effect on the Lake Erie harbors, he says, but not beyond that. Damming the Detroit river might have some good effect in raising the water over the Lime Kilns crossing and Ballard's reef, which have always been more or less troublesome, and perhaps this would be cheaper method than deepening them by the old plan. But deepening the St. Clair river is not necessary to clear obstructions, for there are none there that give trouble. It might deepen Lake Huron a little, but who wants it deepened? Lake Michigan ports can not be affected by any damming process at any points, as they are all much higher than the lower lake ports. South Chicago, Chicago and Milwaukee harbors can only be deepened by the expenditure of vast sums of money in shifting docks and other property and in dredging. Until this is done what good will the damming of

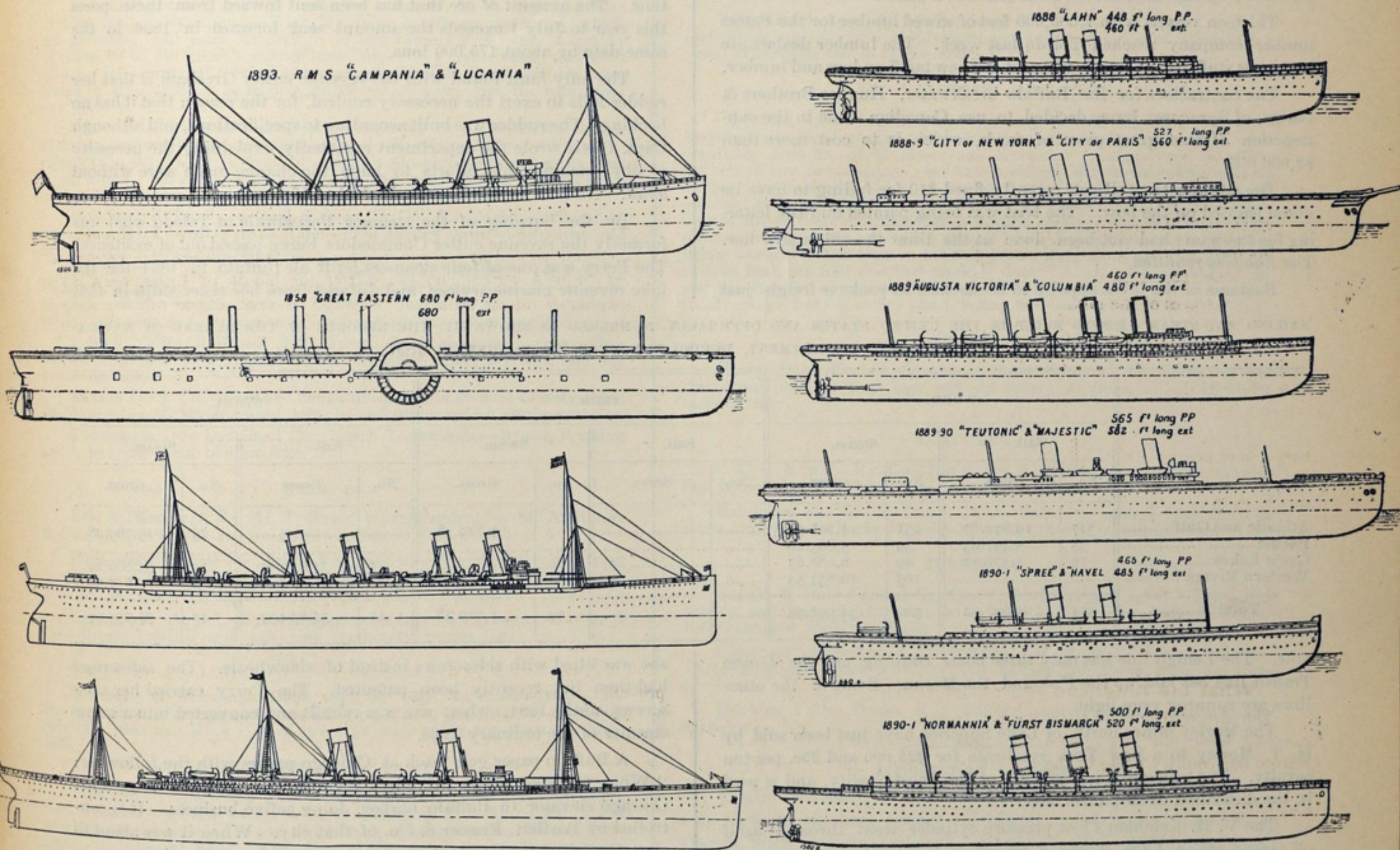


ILLUSTRATION SHOWING INCREASE IN LENGTH OF ATLANTIC LINERS IN TEN YEARS.

NOTE: The two at the bottom on the left are the Oceanic and Kaiser Wilhelm der Grosse, now building. The Great Eastern is included although she was built in 1858. It may be seen that the Oceanic slightly exceeds the famous boat in length.

Works company with the two revenue cutters, Wheeler's with two large ocean tugs, and the Union Dry Dock Co. with a package freight steamer.

Comments on the 20-foot Channel.

An article discrediting Capt. McDougall's judgment on the deepening of lake channels, has been printed in several lake newspapers. In reply to a note from the Review, asking his opinion on the deeper water, he says: "I personally am not losing any sleep on account of it. Our vessels are getting the full benefit of the depth, as well as all others, but we are still three feet short of the 20-foot channel that was looked for, notwithstanding the fact that we had over six feet fall of snow last winter and the greatest rain fall since then in the history of the country. Lake Superior is chuck full—the highest water mark I ever saw—but beginning to recede a little at this end."

Capt. Dunham has predicted that he will live to see a depth of 26 feet in lake harbors. This will be done, he says, not by damming, in

the Niagara do Chicago, as an increased depth at Buffalo could be of no use to vessels bound there from the Lake Michigan ports?

The Lake Superior ports are in the best condition of any. The St. Mary's river needs no dam to deepen that lake. Duluth-Superior now affords a magnificent deep harbor for the loading of all classes of vessels, and Ashland and Marquette are but little behind it.

Drawing 28 feet of water, the monster four-masted British steamship American has left her pier at Columbia stores, Brooklyn, for a trip of 6,000 miles to Cape Town, South Africa. With her, the huge vessel will bear the interests of 3,000 shippers of New York, for that is the number of bills of lading her cargo represents. Twelve thousand tons is the measurement of this immense cargo packed below the American's iron decks, and it means approximately a value of \$2,000,000. This does not include 118 mules in stalls on the upper deck aft. The cargo even includes such trifles as face powder and artificial teeth, wigs and switches, to say nothing of a consignment of glass eyes and another of artificial legs and arms.

Around the Lakes.

By the blowing out of the crown-sheet of the tug Kunkle Bros., Burt Harmon was killed and three others badly scalded at Ashtabula Harbor.

When the Manitou went ashore on Wednesday, the paper published aboard ought to have had a screaming scoop on all its contemporaries.

The ferry steamer Promise of Detroit, which was engaged by a Cleveland company to run in the excursion business, was fined \$500 for not having a proper passenger license.

There is some complaint about some 84 vessels being fined for breaking the Soo river speed rules. Capt. Davis advised raising the limit last year, but masters and owners objected.

The steamship North West, on her trip down the lake last week was detained three and one-half hours in a fog on Lake Superior. She made up this time between the Soo and Detroit.

Thirteen vessels with 7,000,000 feet of sawed lumber for the Peters lumber company reached Toledo last week. The lumber dealers are hurrying stuff from Canada to avoid the new tariff on logs and lumber.

The contractors for the Buffalo breakwater, Hughes Brothers & Bangs, of Syracuse, have decided to use Canadian stone in the construction of that great piece of work, which is to cost more than \$2,000,000.

The steamer Langell was recently fined \$10 for failing to have its name painted on the bow. The boat was being painted and the lettering for the name had not been done at the time the officer saw her. The fine was remitted.

Business of the lakes appears to be slackest in package freight just

error from the iron in his ship, and he should be able to detect just how much he has for the course he is sailing, and allow for it to reach his port of destination in safety.

It is reported that eastern capitalists are backing a scheme for a dry dock on Allouez bay to compete with the barge company's plant. Of course a steel repair plant would have to be built, and the prestige held by the barge company and its connections would leave slim picking for an independent concern.

It is said that within a few days a contract will be signed between the Moreton Track & Storage company of Detroit and the receivers of the Baltimore & Ohio railway for a car ferry service between Detroit, Windsor and Sandusky. Two car ferries with a capacity of twenty-eight cars each will be placed in service.

The total shipments of iron ore from Duluth, Two Harbors and Superior for the month of June exceeded the total shipments from these points for the corresponding month a year ago by over 226,000 tons. The amount of ore that has been sent forward from these ports this year to July 1 exceeds the amount sent forward in 1896 to the same date by about 175,000 tons.

The only fault found with the revenue cutter Gresham is that her rudder fails to exert the necessary control, for the reason that it has no backing. The rudder was built according to specifications, and although Capt. Davis wrote the department repeatedly, explaining the necessity of the backing, his efforts to have the change made were without avail. No lake vessels have unbacked rudders.

By the burning of the steamer Periwinkle at Toledo what was formerly the revenue cutter Commodore Perry passed out of existence. The Perry was one of four steamers built at Buffalo in 1864 for the lake revenue marine service, and differed from her sister ships in that

SAILING AND STEAM VESSELS BUILT IN THE UNITED STATES AND OFFICIALLY NUMBERED AS SHOWN BY THE RECORDS OF THE BUREAU OF NAVIGATION, TREASURY DEPARTMENT, DURING THE YEAR ENDED JUNE 30, 1897.

	WOOD.				IRON.				STEEL.			
	Sail.		Steam.		Sail.		Steam.		Sail.		Steam.	
	No.	Gross.	No.	Gross.	No.	Gross.	No.	Gross.	No.	Gross.	No.	Gross.
Atlantic and Gulf.....	317	19,872.87	131	14,206.56	.....	.....	3	1,819.38	.....	.....	25	19,769.28
Pacific.....	35	5,497.93	39	3,863.20	.....	.....	.....	.....	.....	.....	15	55,866.29
Great Lakes.....	19	4,576.52	29	6,088.63	.....	.....	.....	.....	11	34,630.37	2	617.50
Western Rivers.....	.....	.....	103	10,834.55	.....	.....	.....	.....	.....	.....	.....	.....
Total.....	371	29,947.32	302	34,992.95	.....	.....	3	1,819.38	11	34,630.37	42	76,253.07

now. The Lehigh line has only three boats running and the Union Transit line has laid up the Fisk and the Moran. Some of the other lines are running very light.

The Morley mines north of Lake Superior have just been sold by H. T. Morley to a New York syndicate for \$25,000 and 25c. per ton royalty. The mineral is iron pyrites of the finest quality, and is used in the distillation of sulphuric acid.

The V. H. Ketcham's low pressure cylinder went through itself off Grand island Lake Superior, wrecking that part of the engine so she will have to be towed to Cleveland for repairs. She and her consort were towed to Marquette by the Wm. Chisholm.

The Detroit dry dock company made a record on the rebuilding of the State of Ohio engines. When the disabled steamer was turned over to the company she was promised completed about July 15th. The work was completed two weeks earlier than promised.

The report that the Athens and Algeria went aground at Port Huron because the buoy was out of place is said to be untrue. The buoy is in the right position, but the current is so strong that it places the buoy in such a position that it does not show to advantage.

"Keep cool by taking a lake trip" is the advice given by General Passenger Agent Schantz of the D. & C. line. Visit picturesque Mackinac, the island of cool breezes. Travel via the D. & C. coast line. Send 2 cents for illustrated pamphlet. Address him at Detroit for particulars.

One of the reasons given by Hydrographer Wilson of the Chicago office why lake captains should know navigation is that although an expert compass adjuster may have adjusted the compass of the vessel, he cannot completely correct it, and the captain will always find an

she was fitted with sidescrews instead of sidewheels. The sidescrews had then but recently been patented. The Perry carried her sidescrews until 1884, when she was rebuilt and converted into a screw steamer of the ordinary type.

A Buffalo paper gets back at Chicago papers with the following: "What Chicago needs to reflect upon is that there is a genuine Chicago elevator in Buffalo harbor, doing active business. It is controlled by Bartlett, Frasier & Co. of that city. When it was about to start up, it was announced in Chicago that it would cut the rate in two, and that the pool would come down or go to pieces inside of a week. Its local manager, took pains to announce that it was not a rate cutter, and had no idea of reducing the charges. If Chicago is sincere and wants to go into the missionary business, let it ask these Chicago shippers why they are assisting this wicked pool to hold its rates."

The Lakes Lead in Ship Building.

Ship building on the Great Lakes has been greater than on the coasts for sometime. But the report of Commissioner of Navigation E. T. Chamberlin for the fiscal year shows that the lakes built 25 per cent. more tonnage than all other ports of the United States together. The character and size of the craft is shown by the tonnage built on the lakes, 101,160 tons, including only 74 vessels, while the 76,477 tons built on the coast and rivers included 655 vessels. There were 26 steel vessels built on the lakes, having a tonnage of 90,496, averaging 3,480 tons each. The average size of steel vessels built on the coast was 828 tons each. Throughout the whole country there was a decrease of about 10 per cent. in the tonnage of all vessels built as compared with last year.

Capacity of Lake Erie Ore Docks.

From the 1897 Blue Book of American Shipping. Copyrighted.

More than 8,000,000 tons of iron ore is now unloaded annually from vessels to docks, or transferred direct into cars, at Lake Erie ports. In 1895 the receipts aggregated 8,112,228 tons; in 1896 the total was 8,026,432 tons. Of late years the tendency has been to transfer the ore direct from vessels to cars, thus saving the expense of a second handling, and it is thought that the time is, not far distant when storage capacity will be increased at furnace plants, so that little, if any, ore will be stored on Lake Erie docks. The figures just quoted will serve to show the great capacity of ore docks at Lake Erie ports, which are in most cases equipped with machinery capable of unloading vessels of 5,000 tons capacity in a single day. Names of dock companies and dock managers, together with a description of machinery on each of the docks, are printed herewith. From these same ports about 6,500,000 tons (net) of coal, anthracite and bituminous, is moved annually to upper-lake ports, but the machinery used to transfer the coal from cars to vessels is not the same as that used for the ore.

BUFFALO AND TONAWANDA, N. Y.

Buffalo Furnace Co., F. E. Bachman, manager, M. A. Hanna & Co., of Cleveland, sales agents.—Four McMyler cantilever machines, which are movable; will work hatches of 16 feet centers and over. Capacity of plant, 90 to 140 gross tons per hour, depending upon vessel and kind of ore. It is expected that rock dredging in Buffalo Creek will be completed in May, 1896, so as to provide 19 feet of water over the rock from city zero.

Delaware, Lackawanna & Western Railroad Co., Erie Basin, W. A. Fleming, western freight manager.—Six-rig Excelsior hoist, built by Excelsior Iron Works Co., Cleveland; capable of unloading 2,000 gross tons in ten hours. All rigs can be worked on any vessel having hatches of 24 feet centers or less. No storage room.

Rochester & Pittsburg Coal & Iron Co., W. H. Hazen, dock superintendent, 694 Ellicott Square Bldg.—One Brown hoist of two legs and five Excelsior revolving derricks.

Minnesota Dock Co., C. E. Hebard, superintendent, operated by Pickands, Mather & Co., of Cleveland.—Five McMyler revolving derricks on dock and two of same type on lighters. The latter are for steamboat fueling business and are available for handling ore when required.

Lehigh Valley Railroad, Tift Farm, A. C. Lanctot, agent.—Two Brown hoists with three legs each, two McMyler rotary derricks, and one 40-ton derrick.

Buffalo Dock Co., Blackwell canal, office 65 and 66 Erie County Bank Building.—Six McMyler rotary derricks and tramways for storage service.

Tonawanda Iron and Steel Co., North Tonawanda.—Brown hoisting and conveying plant of four legs.

ERIE, PA.

Erie & Pittsburgh Ry., H. T. Raser, superintendent for M. A. Hanna & Co., of Cleveland.—Twelve Brown hoists of 1896 design.

Philadelphia & Erie Ry., Davis Rees, agent.—Five McMyler revolving derricks of 1890 design; all in good order and capable of unloading 2,500 tons per day of twelve hours.

Carnegie Dock, J. L. Burnett, superintendent for Pickands, Mather & Co.—Brown hoisting and conveying machinery, twelve legs.

CONNEAUT, O.

Pittsburg & Conneaut Dock Co., E. Day, superintendent.—Two Brown rigs of three legs each, one King rig of two legs, and six revolving derricks; also two King rigs of two legs each under construction, May, 1896.

ASHTABULA, O.

Pittsburg, Youngstown & Ashtabula Ry. Co., (Pennsylvania side), Geo. B. Raser, superintendent for M. A. Hanna & Co.—Three plants, one of which has ten legs and two of which have eight legs each. Two of these plants, built by the King Bridge Co., of Cleveland, are modern in every way and can be divided up to work any number of hatches. The third is stationery, 24 feet centers. There are also on this dock nine revolving derricks, which can be worked any way in which they are fitted to vessels.

Lake Shore & Michigan Southern Ry. Co., J. P. Manning, agent.—Docks Nos. 1 and 2, operated by Minnesota Dock Co., (Pickands, Mather & Co.), Ed. S. Henry, superintendent, have Brown rigs of ten and twelve legs, respectively. Dock No. 3, operated by Angeline Dock Co., (J. H. Outhwaite & Co.), J. H. Burton, superintendent, has one Brown rig of six legs and five McMyler rotary derricks. Dock No. 4, operated by Superior Dock Co., (Oglebay, Norton & Co.), J. E. Savage, superintendent, has one Brown rig of six legs, six McMyler rotary hoists, and six hoists made by Variety Iron Works, of Cleveland. Dock No. 5 has a Brown rig of six legs, but in May, 1896, a car-dumping machine for loading coal was being erected on this dock, and if successful the dock will probably not be used for ore. Dock No. 6, operated by Mahoning & Shenango Dock Co., (J. H. Outhwaite & Co.), J. H. Burton, superintendent, has Brown rigs, eight legs, and three McMyler rotary derricks.

FAIRPORT, O.

Pennsylvania & Lake Erie Dock Co., Wm. Truby, manager.—Five Brown rigs, two of four legs each and three of three legs each. The three rigs of three legs each can be used together or separate. There are also on this dock eighteen McMyler revolving derricks, which are used for unloading direct into cars.

CLEVELAND, O.

N. Y., P. & O. Dock Co., M. Riley, superintendent.—Nine Brown

plants of three rigs each, making a total of twenty-seven rigs. All are portable and can be divided up in any way desired. Three to nine vessels, according to size, can be unloaded at this dock at one time.

Cleveland & Pittsburg Dock Co., M. Andrews, superintendent.—One plant of eight legs, five plants of three legs each, and one plant of four legs, all of Brown type and modern in all respects. Machines can be moved to accommodate any number of hatches.

Cleveland, Canton & Southern Railroad, H. R. Moore, general freight agent.—Five McMyler rotary hoists, three of which are rigged for unloading ore; capacity, 1,350 tons per day.

C. C. C. & St. L. Ry. Co. (Big Four), A. J. Ehrler, agent.—This company does not make a specialty of ore business at Cleveland, but has two McMyler rotary derricks on lower flats that can be applied to unloading pig iron in transit for shipment via their line.

Cleveland Rolling Mill Co., A. S. Chisholm in charge of ore business.—Six rigs, Murgatroyd patent type, of two legs each, at Central blast furnaces; quick working and modern; can use four rigs on one vessel or two rigs on each of two vessels.

River Furnace.—Eight dredge cranes, built by Noble & Hall, of Erie, Pa. About four of these cranes can be used to advantage on a vessel.

Valley Dock, operated by Pittsburg & Chicago Gas Coal Co., J. A. Donaldson, agent.—Five McMyler rotary hoists, capable of unloading a vessel of medium size in twelve hours.

LORAIN, O.

Cleveland, Lorain & Wheeling Railway Co., E. M. Pierce, agent.—Brown hoists, six legs, erected in 1895, and of improved type; also, nine revolving derricks, of McMyler and Excelsior manufacture, handling buckets of two tons capacity, and one revolving derrick handling buckets of five tons capacity. Five of the two-ton revolving machines will be bunched in future at one station and four at another, permitting of either four or five of these machines being worked on large vessels. At the five-ton revolving machine there is a double track, which permits of eight cars being worked at one time in loading coal. This same arrangement prevails at both the four and five machine dock. At the stations where four and five two-ton machines are located, either ore or coal can be handled to advantage, but the rotary plant having five-ton buckets is used for coal.

HURON, O.

Huron Dock Co., O. Steadman, superintendent.—One hoisting and conveying plant of four legs and six rotary derricks, all of McMyler manufacture.

SANDUSKY, O.

C. C. C. & St. L. Ry. Co. (Big Four), A. Raine, agent.—Seven revolving derricks of Excelsior type.

Baltimore & Ohio Railroad, B. A. Galleher, agent.—One plant of seven legs, called "Beckert" derrick; can be moved to suit hatches.

TOLEDO, O.

Toledo & Ohio Central Ry. Co., J. W. Reisinger, agent.—Three unloading stations with three revolving derricks for each. Derricks are of Excelsior and McMyler kind.

Cincinnati, Hamilton & Dayton Ry. Co., A. W. S. Irvine, agent.—Three McMyler rotary hoists capable of handling about 125 gross tons per hour.

Hocking Valley Docks, R. J. Mifford, superintendent.—Eight rotary derricks.

Unclaimed Letters.

Letters addressed to names of persons below, without the correct name of the boat remain unclaimed at the marine post-office, Detroit, Mich.: John Anderson; John Ball; John Billingham—Str. S. E. Sheldon; Alex. Bratherston; William Brown; Mrs. Geo. E. Blake; John Chapman; Thomas Chapman—Sch. A. P. Grover; John DeWitt; Geo. Davy; Joseph Downey; Chas. Enright; L. B. Eldredge; Chas. D. Evans; James Ferguson; John Gallagher; Ed. Grilston; Chas. Gregory; Alfred A. Green; W. B. Hawkins; B. Heney—2; Alexander Hay; Art. G. Hill; Frank Hausbeck; Ben. Jacobson; E. L. Jackson; Jas. Johnson; Wm. Klein; Wm. Keenan; Andrew Kearson; Henry Lancto; Capt. Benj. Lehman; John La Forge—Str. Elfmere; J. La Forge—Str. Elfinmere; Nelson Little; Herman Leiba-han; I. H. Martin; Luke Manion; W. P. Mechem—Str. P. Foster; Levi A. Miskin; Jas. Matt; Arthur Montague; Tom Muir—"Grat-wick"; Thomas McCorry; Alvin McCoon; Dan McDonald—2—Str. Siemens; Norman McKenzie; F. McLaughlin; John McNeil—Str. J. B. Ketchum; G. M. McQueen—Str. Curry; Chas. Oag—Str. R. Stewart; James Peters—Str. Andaste; W. J. Quick—Str. Mecosta; Albert Rogers—Str. J. B. Ketchum; Thomas L. Robertson; L. I. Regan; Thomas Robertson; S. H. Rowsell; Martin Richardson; John Ryerson; Mrs. Nellie Spaulding—2—Bge. Albany; Jas. M. Saunders; Charles Sharp; Eugene Scott; James Spears; L. Smith; L. Thatcher; Leroy Thatcher; Nathinal Todd—2; H. G. Vickery; Chas. W. Wat-son; H. J. Warner; L. R. White; M. B. Williams; Louis Zerbe.



DEVOTED TO LAKE MARINE AND KINDRED INTERESTS.

Published every Thursday at No. 409 Perry-Payne building, Cleveland, Ohio,
by John M. Mulrooney and F. M. Barton.

SUBSCRIPTION—\$2.00 per year in advance. Single copies 10 cents each. Convenient
binders sent, post paid, \$1.00. Advertising rates on application.

Entered at Cleveland Post Office as Second class Mail Matter.

The books of the United States treasury department on June 30, 1896, contained the names of 3,333 vessels, of 1,324,067.58 gross tons register in the lake trade. The number of steam vessels of 1,000 gross tons, and over that amount, on the lakes on June 30, 1896, was 333 and their aggregate gross tonnage 711,034.28; the number of vessels of this class owned in all other parts of the country on the same date was 315 and their tonnage 685,204.55, so that more than half of the best steamships in all the United States are owned on the lakes. The classification of the entire lake fleet on June 30, 1896, was as follows:

	Number.	Gross Tonnage.
Steam vessels.....	1,792	924,630.51
Sailing vessels and barges.....	1,125	354,327.60
Canal boats.....	416	45,109.47
Total.....	3,333	1,324,067.58

The gross registered tonnage of the vessels built on the lakes during the past six years, according to the reports of the United States commissioner of navigation, is as follows:

Year ending June 30, 1891.....	204	111,856.45
" " " 1892.....	169	45,968.98
" " " 1893.....	175	99,271.24
" " " 1894.....	106	41,984.61
" " " 1895.....	93	36,352.70
" " " 1896.....	117	108,782.38
Total.....	864	444,216.36

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC. (From Official Reports of Canal Officers.)

	St. Mary's Falls Canals.			Suez Canal.		
	1896*	1895*	1894	1896	1895	1894
Number of vessel passages.....	18,615	17,956	14,491	3,409	3,434	3,352
Tonnage, net registered.....	17,219,418	16,806,781	13,110,366	8,560,284	8,448,383	8,039,175
Days of navigation.....	232	231	234	365	365	365

*1895 and 1896 figures include traffic of Canadian canal at Sault Ste. Marie.

Some Detroit vessel owner has entered into a combine with the editor of the marine column in the Detroit Free Press to regulate the marine business of the lakes. His latest complaint is against the Lake Carriers' Association. The interview claims that all the association is good for is to gain the recognition of congress of the greatness of the lakes and the necessity of giving more money each year for their improvement. He also gives it a rap for making wage cards, that the members do not adhere to. Then he outlines what the work of the association ought to be, as follows:

"But if the association existed for a purpose that it has thus far religiously fought shy of—the regulation of carrying charges—and if it succeeded in this mission, it would bind the owners together in a way that would give the organization mighty power indeed." This statement carries its own trademark, and the vessel owner must be new in the business not to have known that agreements have been made and broken among its members and owing to the diversified interests of lake commerce such agreements cannot be kept. If the Lake Carriers' Association went to dabbling in freights it would not stick together ten days, and its work is now thoroughly appreciated by all the owners who have been in the business long enough to know anything about it.

The establishment of a subsidized steamship line between Canada and the Central and South American ports may be safely regarded as an event of the near future, says the San Francisco Chronicle. In the first place, such a project is now under way; in the second, it has behind it the practical encouragement of two successful previous ventures. With the aid of Dominion subsidies a line of first-class steamers has been put on between Vancouver and Hongkong, to the obvious disadvantage of our local trade, and another between Vancouver and Australian and Hawaiian ports. Both enterprises have paid. Hence it is a reasonable presumption that the Canadians will try their luck along the Spanish-American coasts, where opportunities exist that are not afforded by either of the other markets.

A well-equipped competing line of this sort would be a serious matter for our mercantile and shipping interests. With the advantage of cheaply built British steamers, low-priced seamen and low-priced coal there would be the same marked difference in favor of the Canadian line which the British mercantile marine has long held over American rivalry. When to these advantages would be added a subsidy, nothing could be left our own maritime traders with the south coast except to do business at a loss, to go out of it altogether or to in-

duce congress to put them on a fighting equality with their rivals by providing subsidies also.

Whatever may be the abstract opinion about the subsidies for the merchant navy we shall have to come to them or let what little foreign carrying trade we have left go to the dogs with what we used to possess. It needs but little argument to prove this. When rebates were given by the railroads the merchant who could not get one was unable to compete with the other who could. The same is true of shippers. It is a familiar principle of trade, and needs no special elucidation. We all know that the man who can do business at least expense is the one who gets the most of it to do, all other things being equal.

New Rules of the Road.

By proclamation of the Cleveland administration made Dec. 31, last year the new international rules of the road at sea went into effect July 1. The new code covers all vessels on the high seas and in waters connected therewith which are navigable by sea-going vessels. The most important is the provision permitting vessels to carry an additional white light beside the one required. On a dark night there is no way of telling whether a vessel flashing one white light is 100 feet long or 500. The new law places these lights in line with the keel so that one shall be at least 15 feet higher than the other, and in such a position with reference to each other that the lower light shall be forward of the upper. The vertical distance between these lights shall be less than the horizontal. In this way other vessels can tell the course of the lighted ship.

Under the new rules a vessel is "under way" when she is not at anchor, or made fast to shore, or aground, and for a vessel whose engines are stopped, so that she is not moving, but whose anchor is up, there is a rule providing that in fog instead of ringing her bell and occasionally tooting her whistle she shall whistle every two minutes with two blasts.

Another new rule says that a vessel when towing, a vessel employed in laying or in picking up a telegraph cable, and a vessel under way, which is unable to get out of the way of an approaching vessel through being not under command, or unable to manoeuvre as required by the rules, shall, at intervals of not more than two minutes, sound one prolonged blast followed by two short blasts. A vessel towed may give this signal and she shall not give any other. Sailing vessels and boats of less than 20 tons gross tonnage shall not be obliged to give these signals, but if they do not they shall make some other efficient sound signal at intervals of not more than one minute.

The rules have been under discussion for nearly eight years. The International Marine Conference met in Washington in 1889 and agreed upon new regulations which were to be put in effect by a proclamation of the president when the action of the conference had been ratified by the leading maritime nations of the world.

The British board of trade, however, objected to the sound signals contained in the amended regulations, and after much discussion another session of the American delegates to the international conference was held last year in Washington, at which the recommendations of the British board of trade were agreed to.

The only countries having a merchant marine which have not agreed to the new rules are Turkey, Venezuela, Costa Rica, Nicaragua, and Zanzibar, and it is expected that Venezuela will come in when the authority of the congress is assured. Ninety-five per cent. of the world's shipping is affected by the agreement.

A comparison between the pay of men in the United States Navy and the pay of men in the British naval service shows the marked financial advantage which accrues to the American sailor. We pay a midshipman \$1,200 a year, while England pays him \$160. We pay a naval cadet \$500 a year, while England pays him \$90. We pay a mate \$1,200, while England pays him \$600. Uncle Sam pays his gunners and boatswains from \$1,200 to \$1,800 a year, while Johnny Bull pays only from \$500 to \$750. Subordinate officers we pay from \$426 to \$840, while England pays from \$160 to \$900. Higher officers of our navy, however, receive much smaller salaries than British officers of equal rank. A rear admiral in our navy draws \$6,000 a year, while the British officer receives \$13,685. An American commodore gets \$5,000, while an English commodore receives \$6,600. An American captain gets \$4,500 a year, a British captain \$4,650. An American commander gets \$3,500 against \$2,530 for his British cousin. For all officers ranking the last the Englishman draws far the larger salary.

Early Reminiscences.

Early in May, 1844, the steamboat Rochester departed from the foot of Main street, Buffalo, bound for Chicago. Her crew consisted in part as follows: Thomas P. Folger, master; Harry Weishum, mate; William McGee, engineer; O. H. P. Champlin, clerk; Bartley Logan, steward, and the writer in a minor capacity. During his mechanical work, Engineer McGee had constructed a small steam whistle from plans described in the Scientific American, and which he attached to the boiler of the Rochester, more for the novelty thereof than for its utility. While the boat was moored at the foot of Main street the whistle was sounded, the first to give voice on the Great Lakes. Prior to the advent of the whistle large tolling bells were hung above decks on all lake steamboats, and which in a manner supplied the present uses of the steam whistle.

On the passage up the lakes McGee's noisy little stranger was sounded to many ears curious of its significance, and in one instance, therefore, nothing but the determined intervention of mutual friends prevented a serious encounter between two stalwart men.

During the winter preceding, Captain C. L. Gager had reconstructed the steamboat General Porter into a propeller, and between him and Engineer McGee, an old feud existed. A few miles below Mackinaw the Rochester overhauled and passed the General Porter and at this time McGee blew his whistle defiantly and persistently. The steamboat landed at Mackinaw as also did the propeller, when Captain Gager appeared on the wharf loudly denouncing the man who so insultingly "squawked that thing at him." McGee was prompt to assume the responsibility, leaping onto the wharf with fierce determination. Then came the resolute intervention preventing war, and thus was demonstrated the utility of the steam whistle on the Great Lakes—and its inauguration without bloodshed.

A Detroit vessel owner, in recalling the sailing days of Capt. Harvey Pheatt, mentioned his manner of loading fuel at the South Manitou when sailing the side wheel steamer Forest City in the 50's. The island had a single dock at which the steamer could load, but the beach ran into 20 feet of water so abruptly that timber could not be found on the island long enough to be made into spiles for the support of the dock at that depth, so it was built out to the edge and they let it go at that, not being willing to go to the expense of cutting the timber elsewhere and rafting it. The Forest City would come up as closely to the dock as she dare under a good head of steam and speed. When near the north end Pheatt would port his wheel hard and drive her nose up into the sandy beach. This would bring her after gangway pretty close to the dock, and into this gangway the deckhands would shoot the sticks of wood. When she had enough aboard to carry her to her destination it would be found that the wood had loaded her down enough to enable her to back off easily. Otherwise the utmost power of her engines would have been necessary to back her off, and then, perhaps, she would have gone aground again stern first.

The Teutonic arrived in Liverpool on Monday, and on Wednesday she was equipped with her entire armament of eight large and eight smaller rapid fire guns ready for use to take part in the naval parade at Spithead. The time taken up in equipment was forty-eight hours. Had war been imminent, it is probable that the time could have been shortened one-half, and the Teutonic would have been put in readiness for sea, bristling with a formidable armament in a single day. She could then set out to destroy the merchant marine of a hostile nation, to enforce a sudden blockade, or to assist the regular fleet. In other words, an ocean greyhound like the Teutonic may come into port one day as a merchant ship and leave port the next day equipped as a cruiser and ready for war. When the possibilities involved in such a transformation are considered, it is little wonder that the Teutonic was a special object of interest in the great review.

It has been decided by the British admiralty to build a new yacht for the queen, and the design has been submitted to and approved by her majesty. The new vessel, which will be built at the Pembroke dock yard, will, in general outline, resemble the great Atlantic liners. It will be 620 feet long, with only 50 feet beam, will be fitted with powerful engines, so as to have a great speed. While no expense will be spared in order to make the vessel the finest of her class afloat in her decorations and fittings, she will closely resemble her majesty's present yacht, the Victoria and Albert.

Screw Propeller Experiments.

The inventor of the turbine engine for marine purposes failed in his first attempt, but to discover the cause he made some very interesting experiments in propeller speed. He says that trials were made with screws of various patterns, but the results were unsatisfactory, and it was apparent that a great loss of power was taking place in the screw.

To investigate the question thoroughly, a spring torsional dynamometer was constructed, and fitted between the engine and screw shaft, measuring the actual torque transmitted. The measurements conclusively proved that the cause of failure lay entirely in the screws, and, with the object of further investigating the character of this waste of power, a series of experiments were made with model two-bladed screws of 2-in diameter revolved in a bath of water heated to within a few degrees of the boiling point, and in order that the model screw should produce analogous results to the real screw, it was arranged that the temperature of the water and the head of the water above the propeller, as well as the speed of revolution, should be such as to closely resemble the actual conditions and forces at work in the real screw, the object in heating the water being to obtain an increased vapor pressure from the water, so as to permit a representation of the conditions with a more moderate and convenient speed of revolution than would otherwise have been necessary.

The screw was illuminated by light from an arc lamp reflected from a revolving mirror attached to the screw shaft, which fell on it at one point only of the revolution, and by this means the shape, form, and growth of the cavities could be clearly seen and traced as if stationary. It appeared that a cavity or blister first formed a little behind the leading edge, and near the tip of the blade; then as the speed of revolution was increased, it enlarged in all directions until at a speed corresponding to that in the Turbinia's propeller, it had grown so as to cover a sector of the screw disc of 90 degrees. When the speed was still further increased, the screw, as a whole, revolved in a cylindrical cavity, from one end of which the blades scraped off layers of solid water, delivering them on to the other. In this extreme case nearly the whole energy of the screw was expended in maintaining this vacuous space. It also appeared that when the cavity had grown to be a little larger than the width of the blade, the leading edge acted like a wedge, the forward side of the edge giving negative thrust.

From these experiments it would appear that in all screws, of whatever slip ratio, there will be a limiting speed of blade, depending upon the slip ratio and the curvature of the back—in other words, on the slip ratio and thickness of blade; beyond this speed a great loss of power will occur; and that, should the speed of ships be still further increased, the adoption of somewhat larger pitch ratios than those at present usual will be found desirable.

It is not proposed here to trace further the losses of power by cavitation, but generally speaking, the effect is felt in the case of the real ship, not in the racing of the screw, but in loss of propulsion effect.

In the model experiments, however, in hot water, the effect was both loss of propulsion effect and also racing, as would naturally be expected from the fact of greater vapour density of the water in the latter case rendering the cavities more stable.

A series of model experiments on cavitation in cold water on the lines described would be extremely interesting, and probably instructive, but would require more elaborate, powerful, and extremely high speed apparatus than was at our disposal. It would also seem that the limitation imposed on slip ratio tends in favour of larger pitch ratio for very fast vessels.

The single compound turbine engine was now removed from the boat and replaced by three separate compound turbines, directly coupled to three screw shafts, working in series on the steam, the turbines being the high pressure, intermediate, and low pressure, and designed for a complete expansion of the steam of 100-fold, each turbine exerting approximately one-third of the whole power developed, the three new screw shafts being of reduced scantling.

By this change the power delivered to each screw shaft was reduced to one-third, while the division of the engine into three was favorable to the compactness and efficient working of the turbines. The total weight of engines and the speed of revolutions remained the same as before. The effect on the screws was to reduce their scantling, and to bring their conditions of working closer to those of ordinary practice. The thrust of the propellers is balanced by steam pressure in the motors.

Stocks of Grain at Lake Ports.

The following table, prepared from reports of the Chicago board of trade, shows the stocks of wheat and corn in store in regular elevators at the principal points of accumulation on the lakes, July 3, 1897:

	Wheat, bushels.	Corn, bushels.
Chicago	4,025,000	7,562,000
Duluth	1,175,000	17,000
Milwaukee	106,000	3,000
Detroit	20,000	24,000
Toledo	219,000	471,000
Buffalo	564,000	356,000
	6,109,000	8,433,000

As compared with a week ago, the above figures show, at the several points named, a decrease of 836,000 bushels of wheat and 573,000 bushels of corn.

In General.

The steamer St. Louis has broken the New York Southampton record, 6 days 10 hours and 55 minutes, which has been held by the Fuerst Bismarck since September, 1893.

The Danish steamer Nadeshnij, which arrived at Hongkong on May 11, is an icebreaker, intended for service at Valdivostock, having been built quite recently in Denmark to the order of the Russian government.

Charles H. Cramp, the head of the great shipbuilding concern of Philadelphia, the largest in the country, is now in St. Petersburg, Russia. Mr. Cramp in times past has been decorated by the Czar and is persona gratia at the Russian court.

H. & A. Allan announce that the Allan Line Steamship company has been incorporated in London, Eng., with a capital of \$1,750,000 which may be increased. The Allans have bought three new freight steamers which will go into the New York trade.

A fleet of ten torpedo boats will be sent up the Mississippi river as far as Dubuque some time this summer. The object is to show the people in the larger cities along the river what modern boats of their class are like. None of the torpedo boats draw over six feet of water and they can easily make the trip without much fear of being grounded.

OFFICE OF THE LIGHT-HOUSE BOARD,
Washington, D. C., June 29, 1897. Sealed proposals will be received at this office until noon on Saturday, the 31st day of July, 1897, for furnishing the materials and labor of all kinds necessary for rebuilding and repairing the light-house tender Holly. The repairs to said vessel must be completed and the vessel delivered within six calendar months from date of the approval of the contract by the Secretary of the Treasury, and bidders are informed that because of the urgent need of the speedy delivery, the element of time to be consumed in repairing and rebuilding the vessel will be given large consideration in determining the award of the contract, and the contract will be awarded to the lowest best responsible bidder. Each proposal must be accompanied with a certified check payable to the order of the Secretary of the Treasury, in the sum of one thousand dollars (\$1,000). The certified check of the successful bidder will be retained until the execution of a formal bond or contract, and the approval of the same by the Secretary of the Treasury, and the certified checks of the unsuccessful bidders will be returned immediately after the proposal of the successful bidder has been accepted.

Forms of proposal, plans and specifications showing what is required, can be had or seen by applying to this Office.

The right is reserved to reject any or all bids and to waive any defects. W. S. SCHLEY, Captain, U. S. N., Chairman.

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ALSO QUOTATIONS from Market men and Grocers on the Lakes for Provisions and Meat, best quality only.

CATALOGUES without quotations are not wanted.

ALL GOODS except provisions to be delivered in Cleveland.

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CLEVELAND, OHIO.

The Harlan and Hollingsworth Company is making preparations for building Howard Gould's yacht Niagara. The dimensions of the Niagara will be as follows: Length over all, 270 feet; length on water line, 245 feet; breadth of beam, 36 feet; depth of hold from spar deck, 28 feet; depth of hold from main deck, 20 feet; free board, amidships, 13 feet; free board at bow, 18 feet; tonnage, 1,900.

The William Cramp & Sons Ship and Engine Building Company reports for year ending April 30 last, gross income of \$4,500,000, from which was realized a profit on labor and material of \$770,000; deducting \$340,000 for general expenses, repairs, salaries, interest, taxes, insurance, new machinery, etc., leaves a profit for the year of \$430,000, equal to 8.86 per cent. on its \$4,848,000 capital stock as a result of the year's operations. The debt of the company was reduced \$995,000.

The works of The Roberts Safety Water Tube Boiler Co. are still very busy, and have been working night and day for some time past notwithstanding their increased size owing to extensions which have doubled their capacity twice in the last seven years. This company has built nearly 900 boilers to date and now has orders enough on hand to keep them busy for the next three months without considering other orders which are constantly coming in. Although the Roberts boiler was originally used almost exclusively for steam launches and steam vessels of similar character, they are now in general use for vessels of different governments and also for factory purposes, electric light and power, portable paving and drying plants, steam canal boats, floating dredges, excavators, sugar and coffee plantations, portable saw mills, and many other purposes for which a perfectly safe, light, and small but powerful boiler would be advantageous. This company reports that its business could not be better and that its works have never been so busy previously at this time of the year. Of course, their orders for boilers for launches, yachts, passenger steamboats, freight steamers, etc., are increased notwithstanding the demand for boilers for other purposes.

Eight dollars from Cleveland to Mackinac and return, \$7 from Toledo to Mackinac and return, \$6 from Detroit to Mackinac and return: The foregoing special tourist rates will be put into effect June 20th, via Detroit & Cleveland Steam Navigation Co.'s new mammoth steel passenger steamers. The round trip from Cleveland, including meals and berths, costs \$16, from Toledo \$14, from Detroit \$11.50. Send 2 cents for illustrated pamphlet. Address A. A. Schantz, G. P. A., Detroit Mich.

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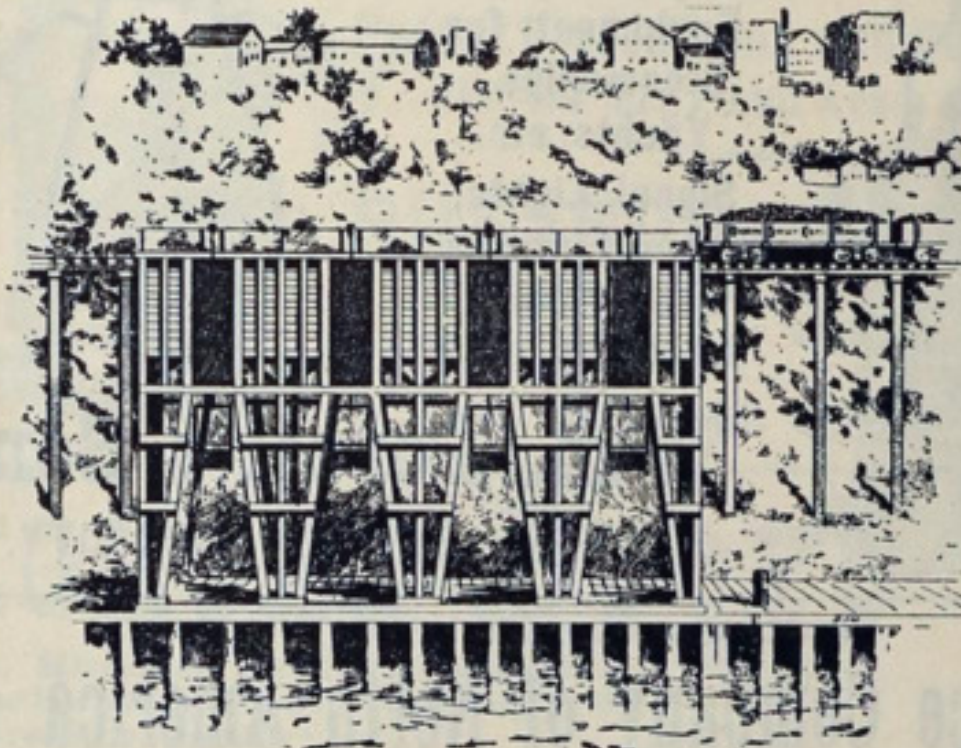
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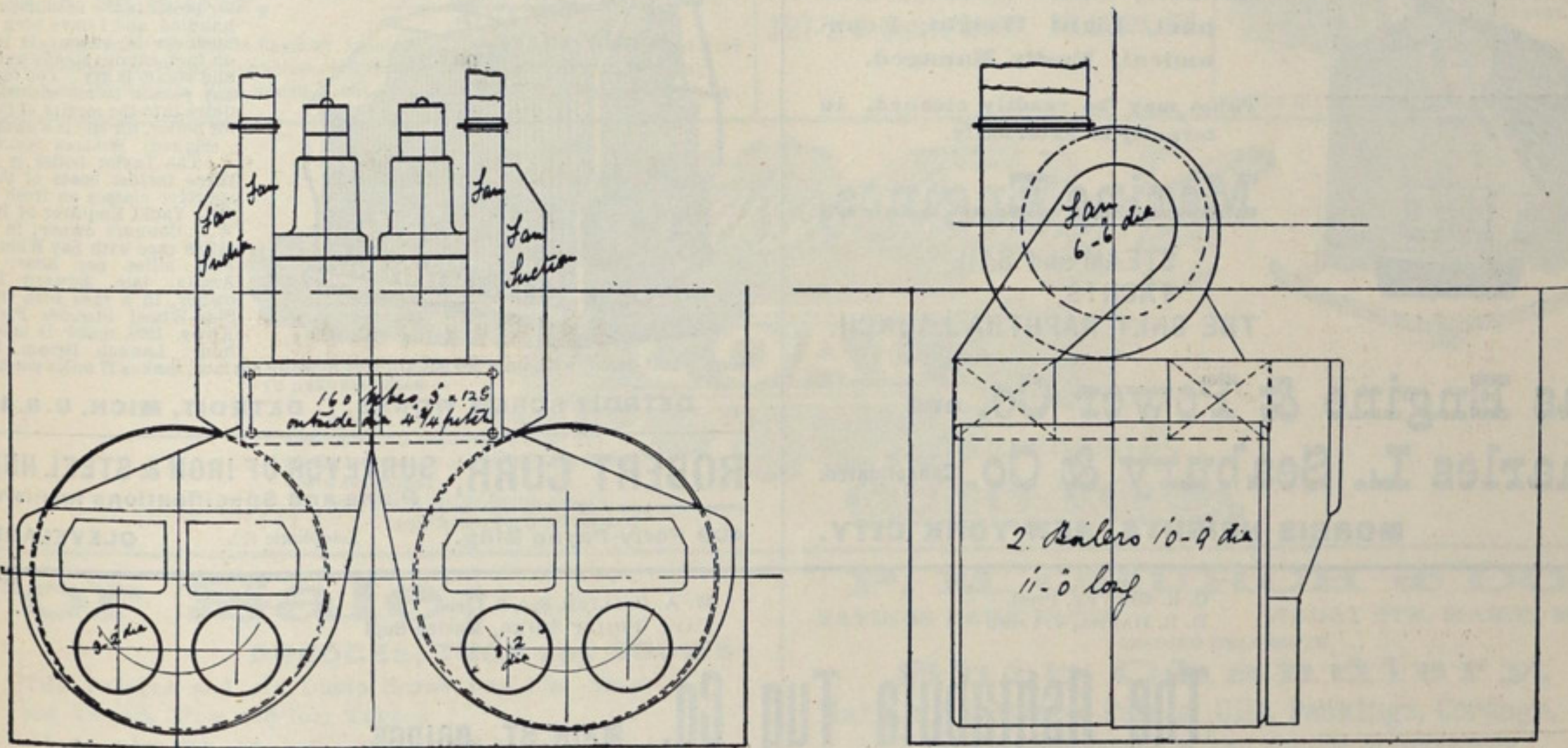
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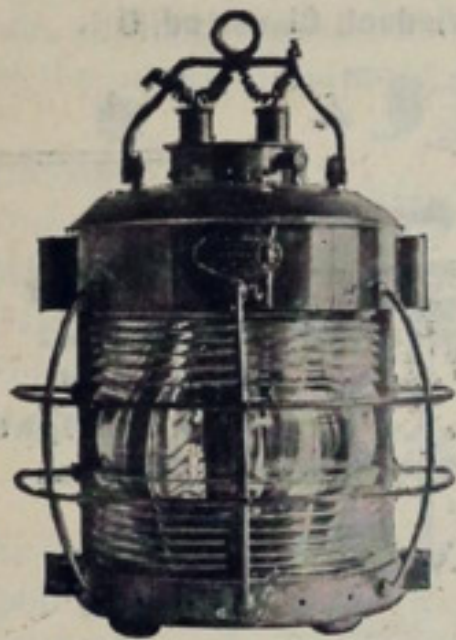
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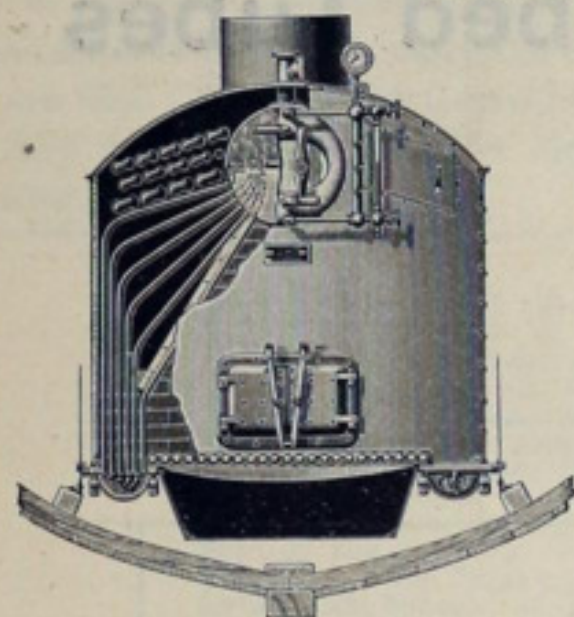
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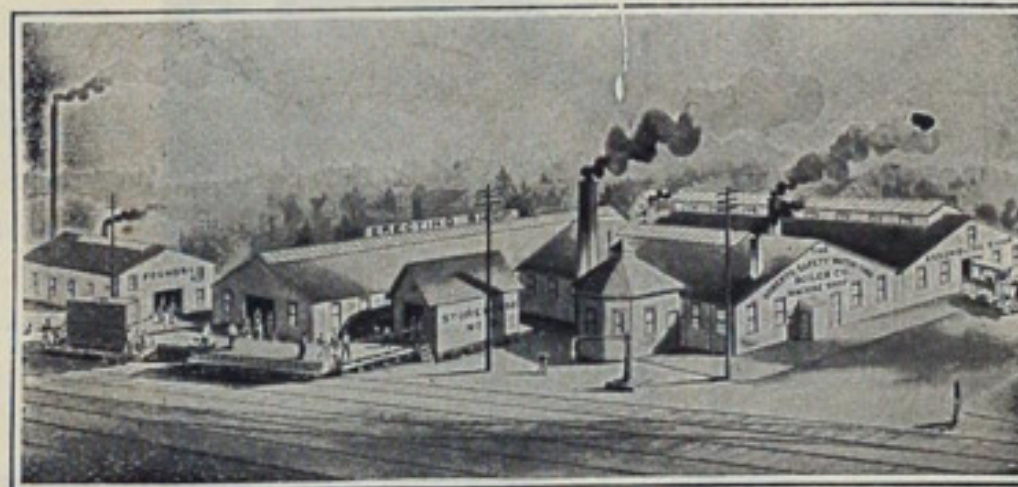
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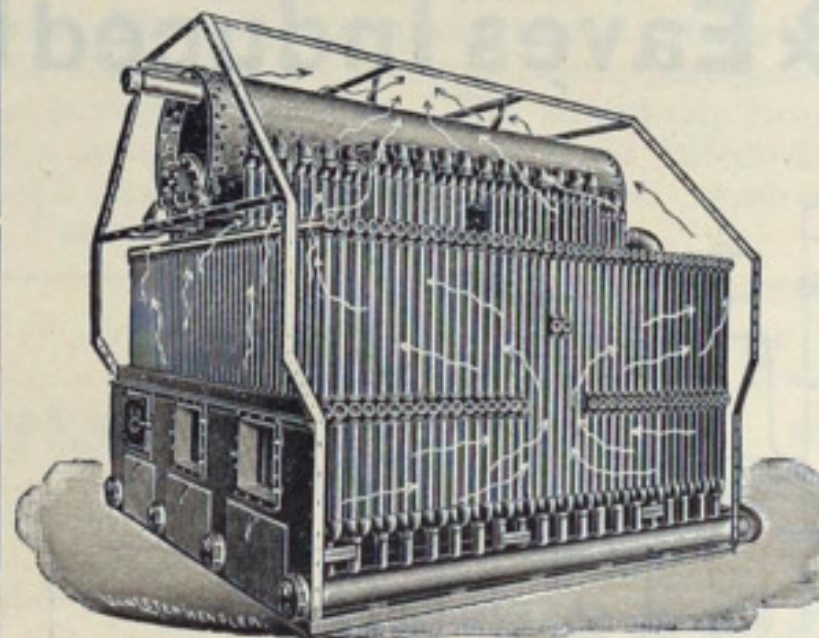
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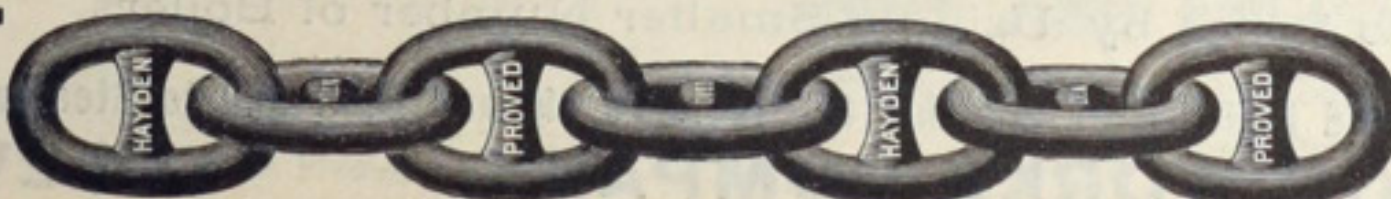
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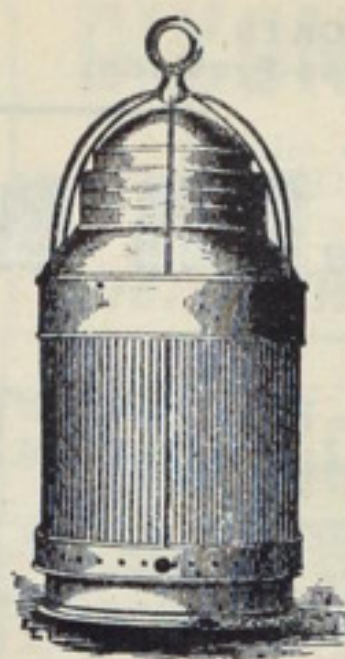
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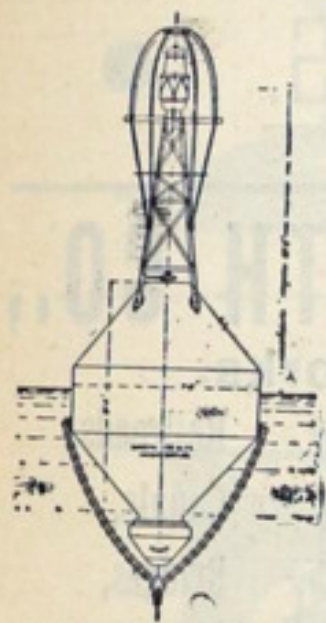
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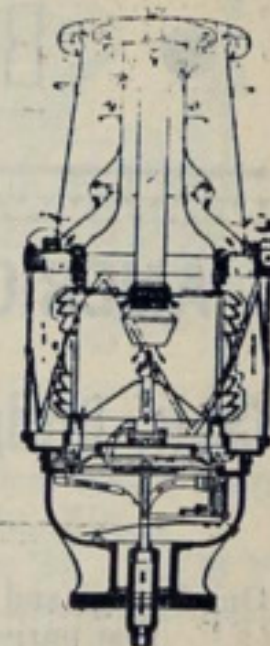
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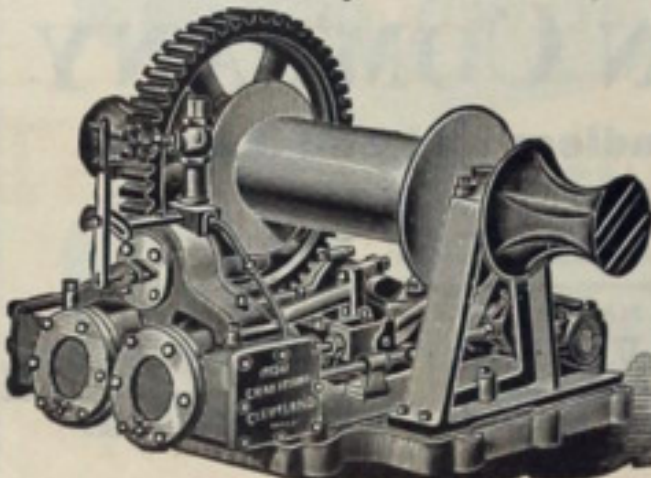
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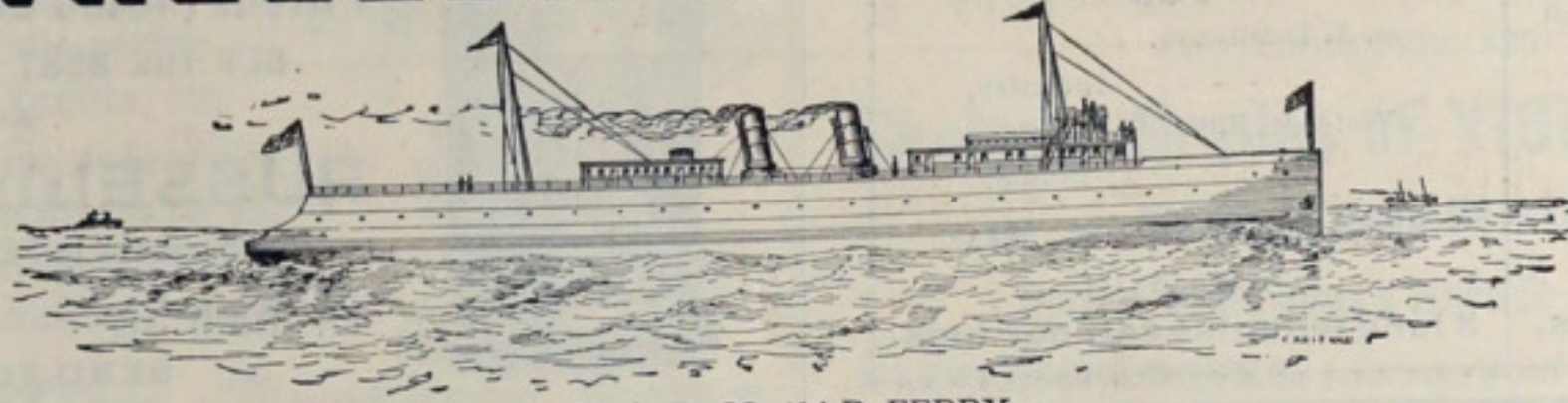
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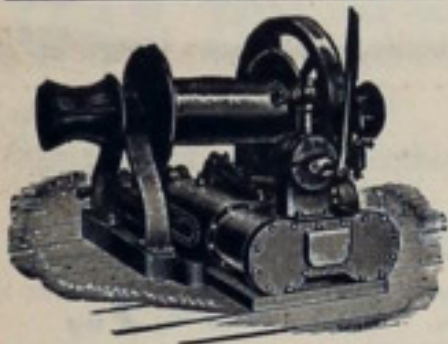
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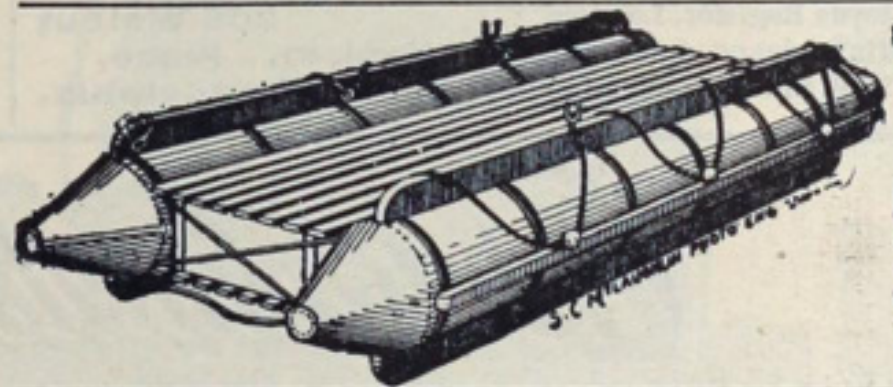
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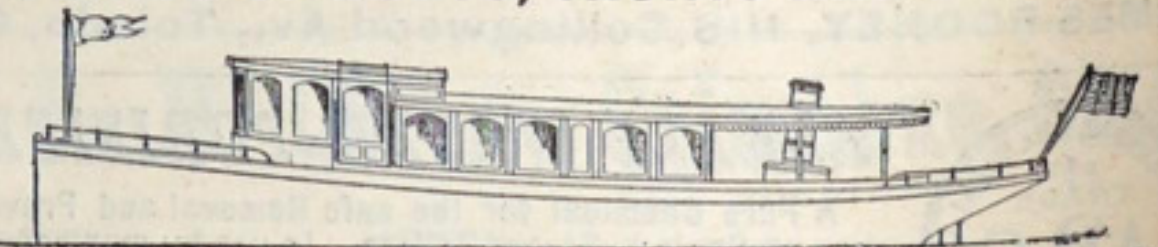
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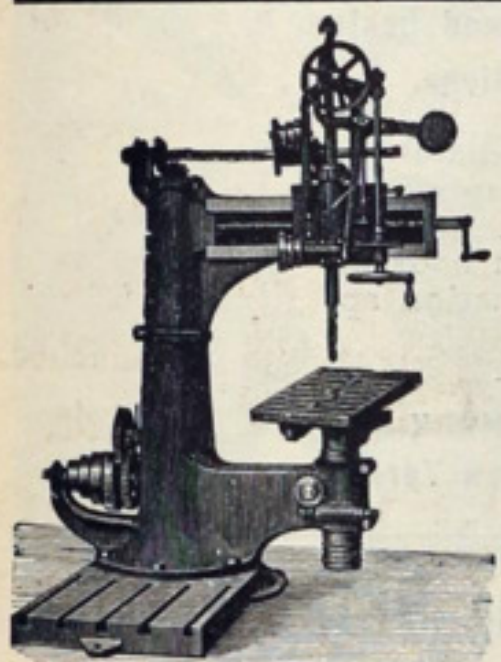
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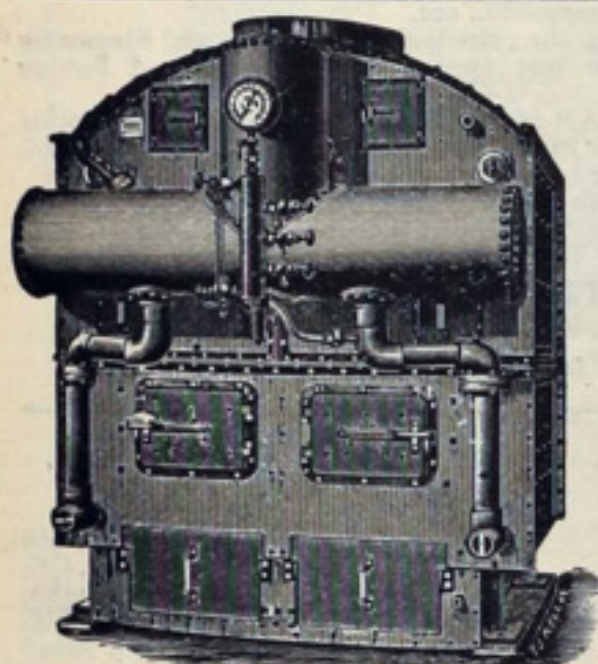
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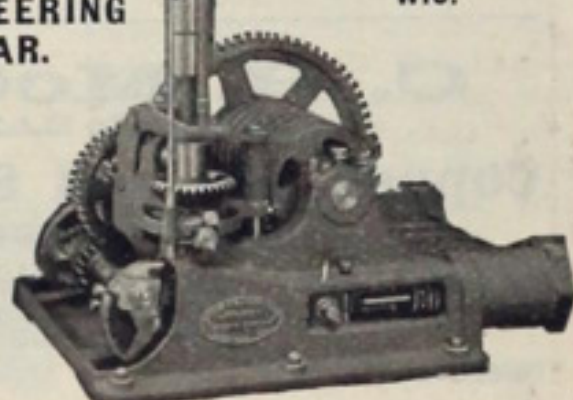


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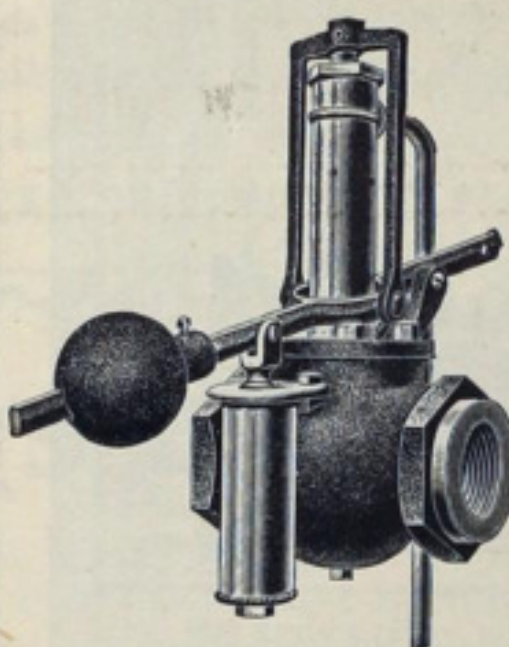


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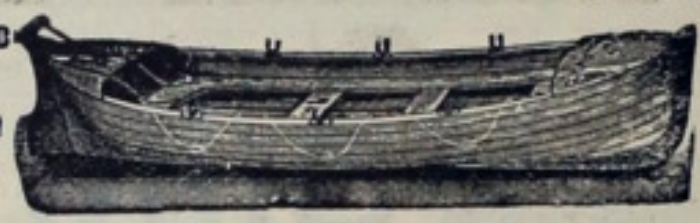
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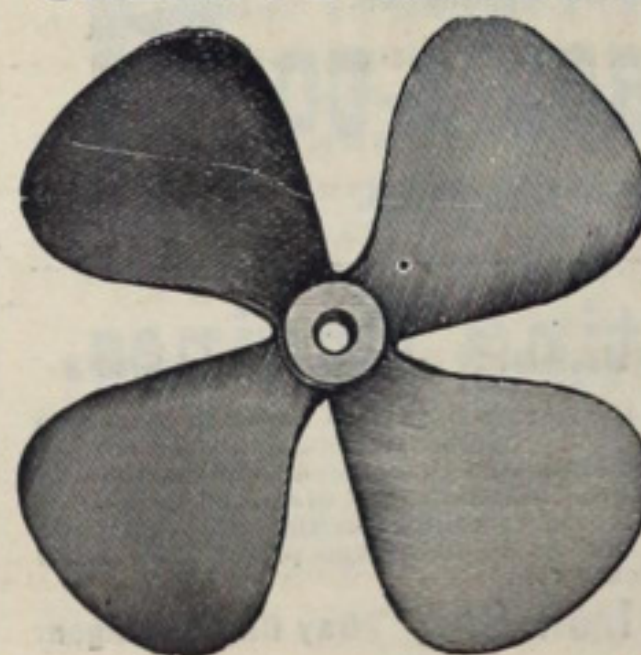
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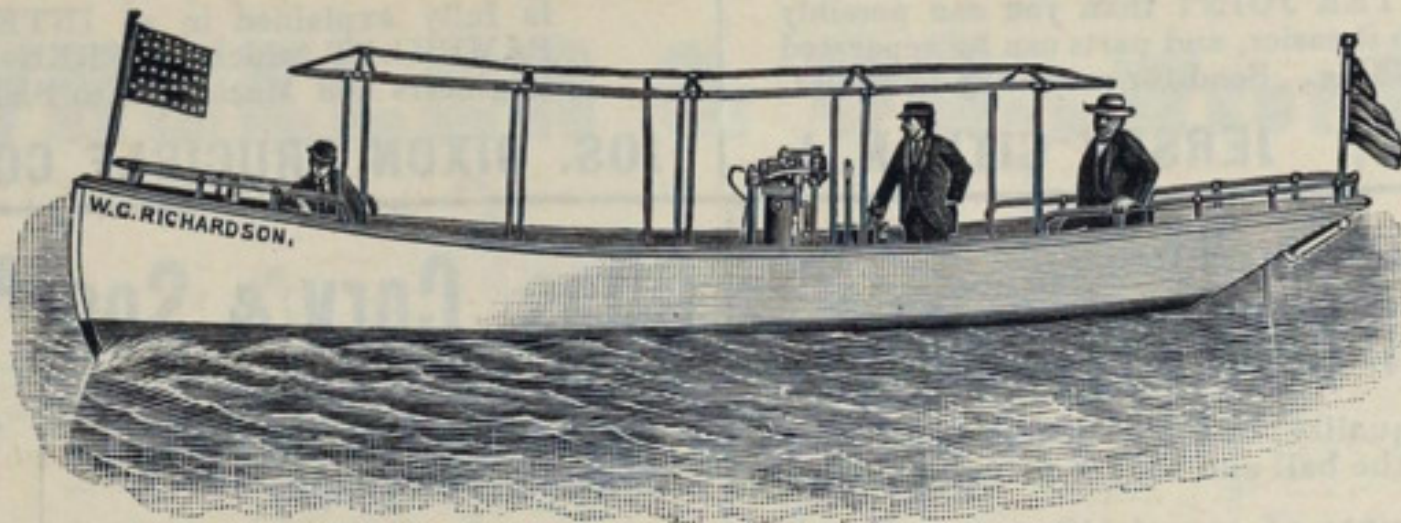


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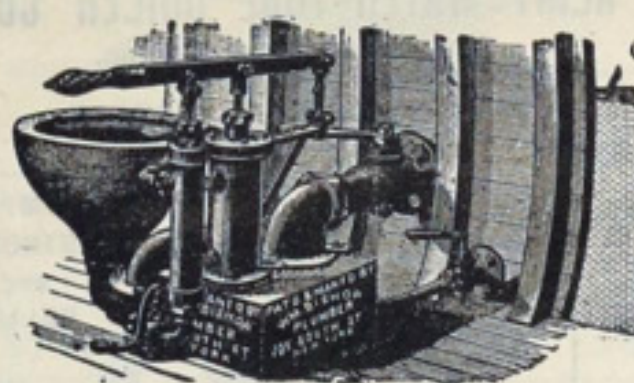
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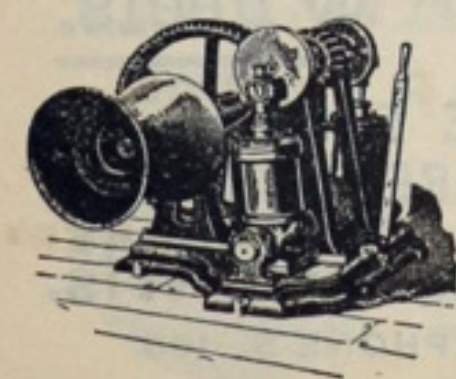
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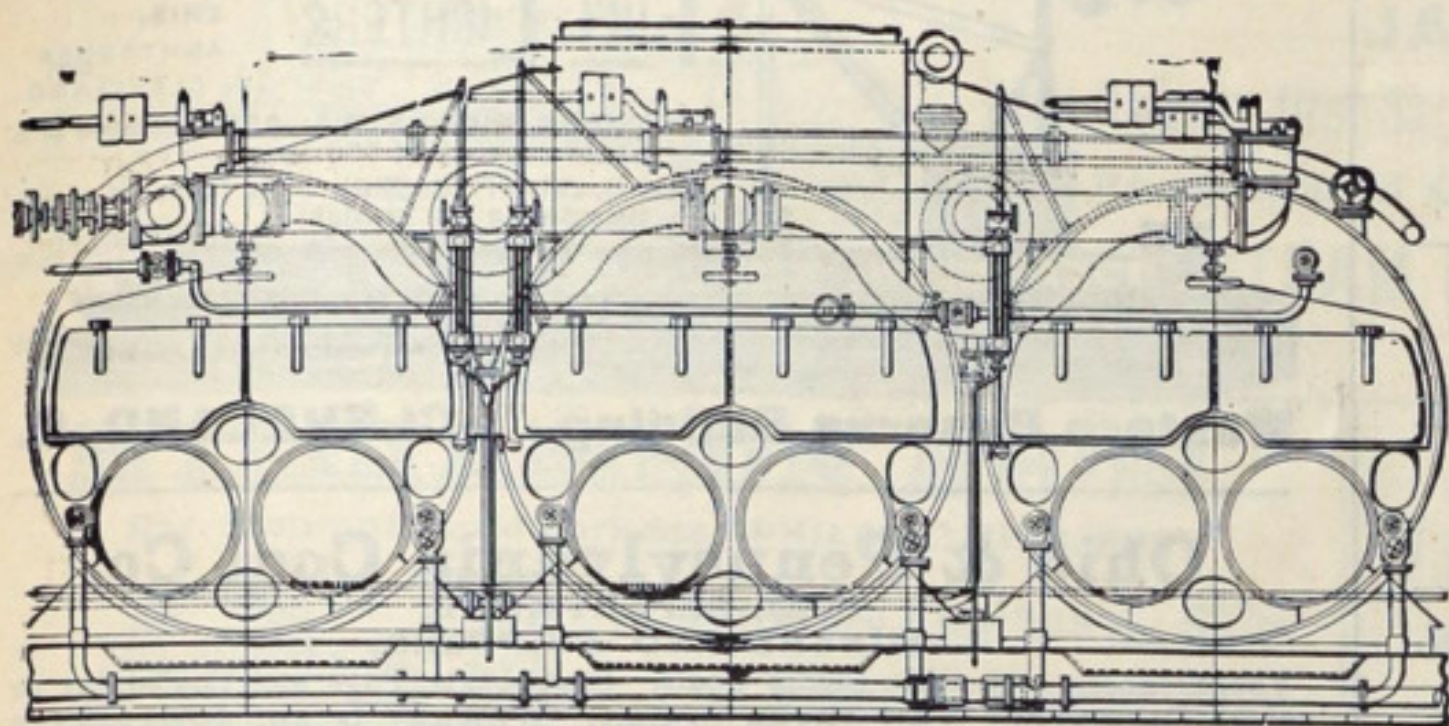
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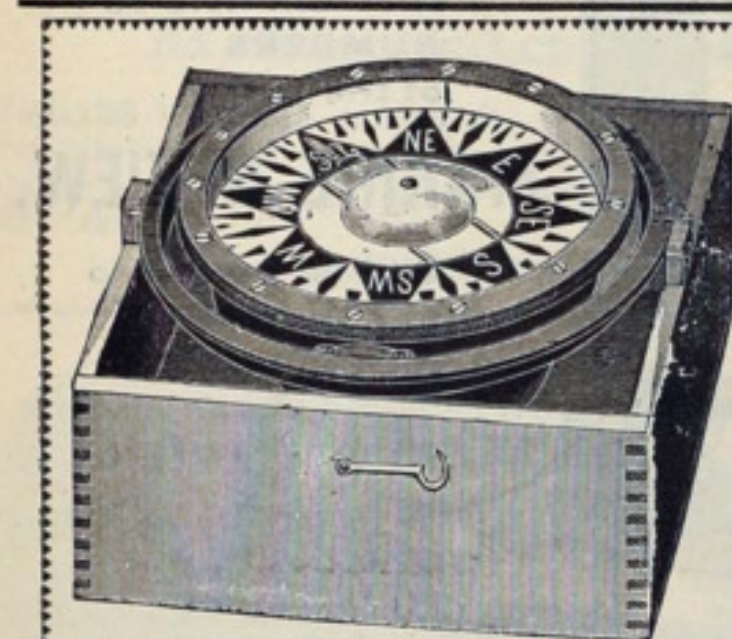
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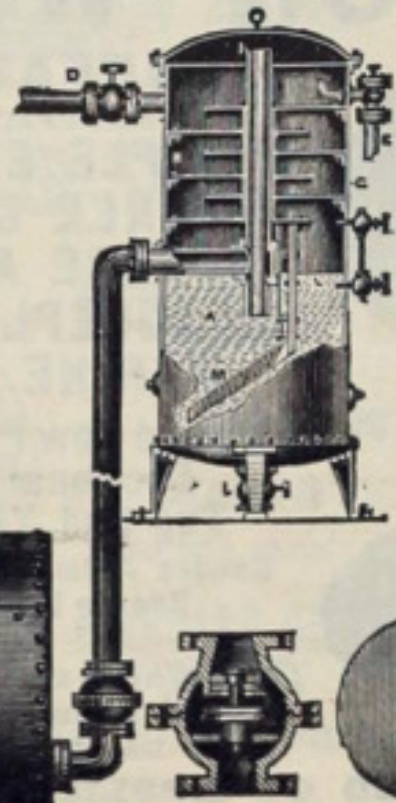
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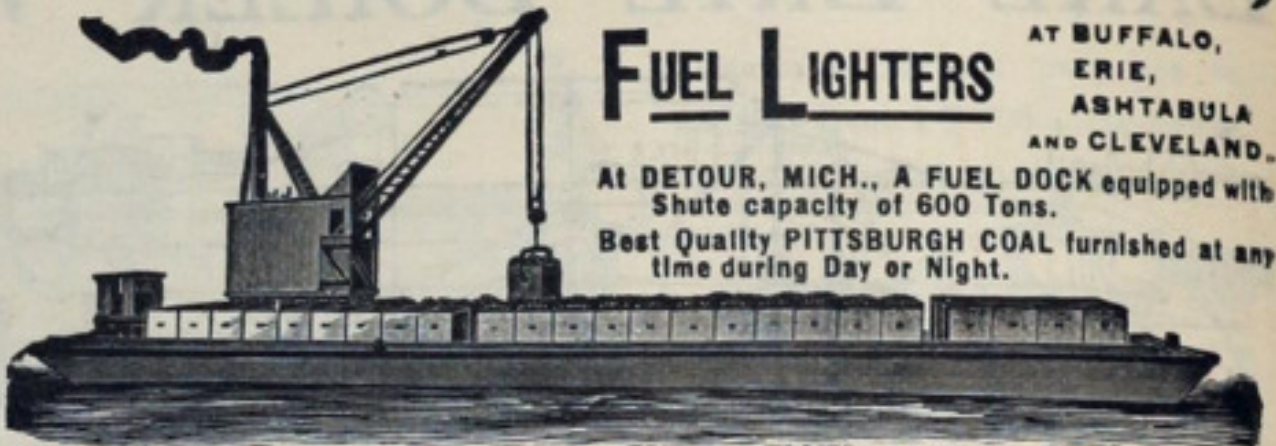
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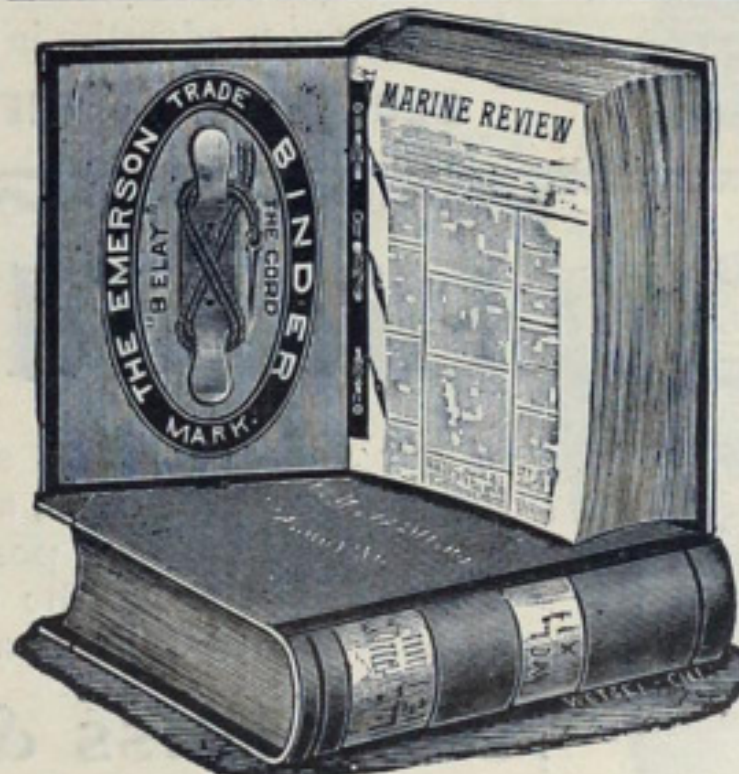
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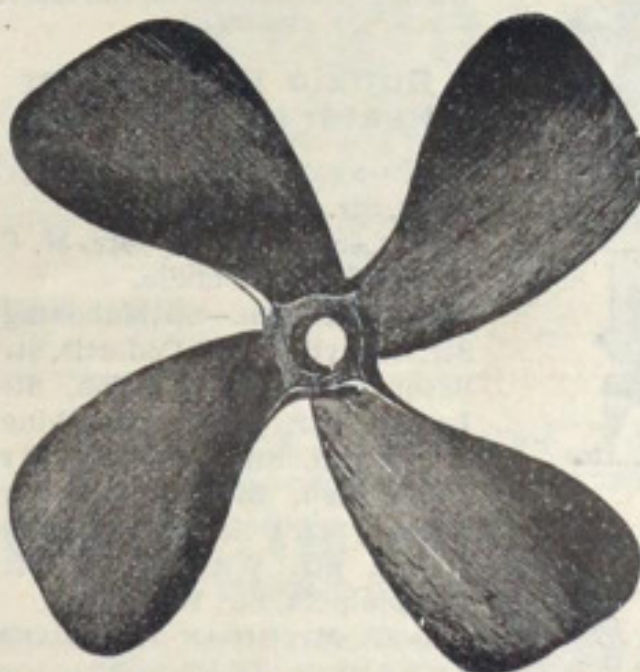
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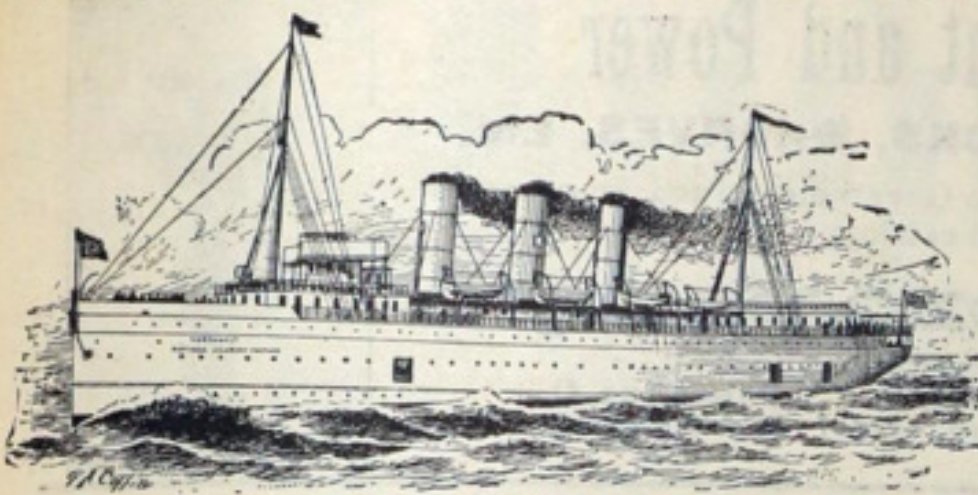
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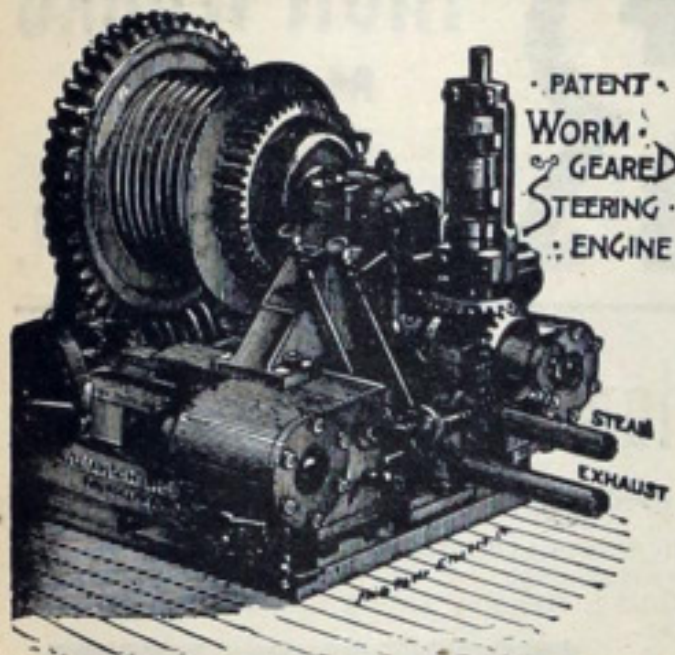
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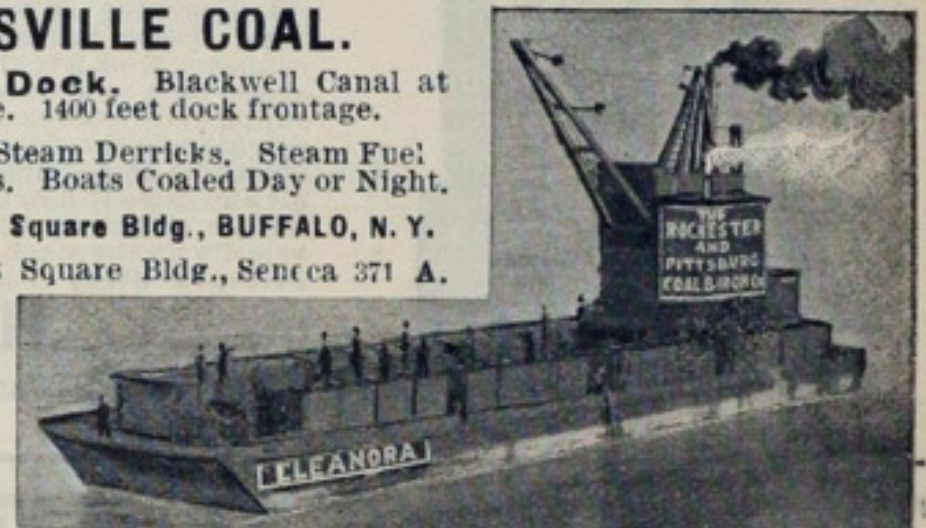
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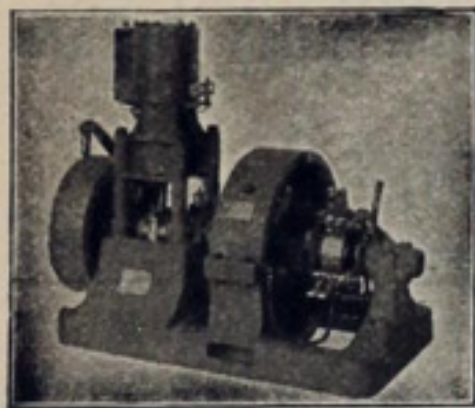
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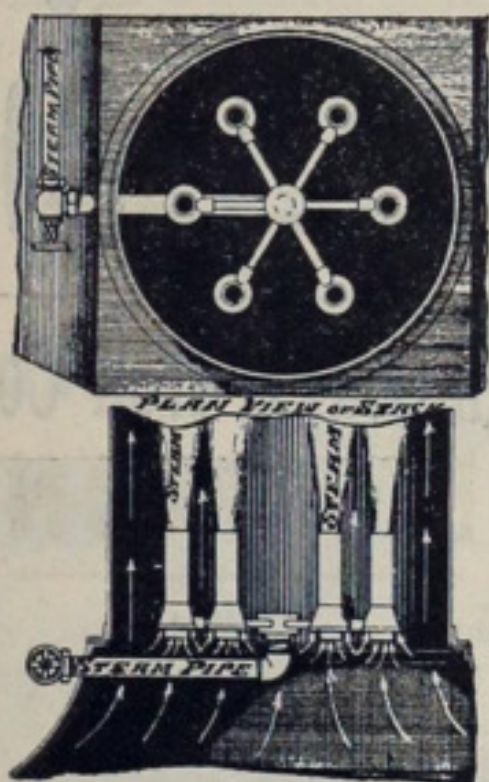
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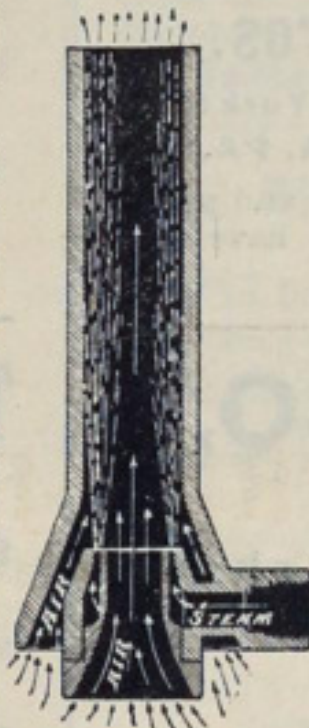
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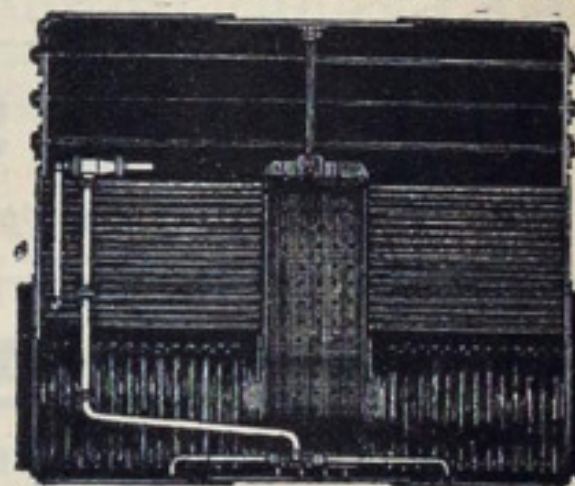
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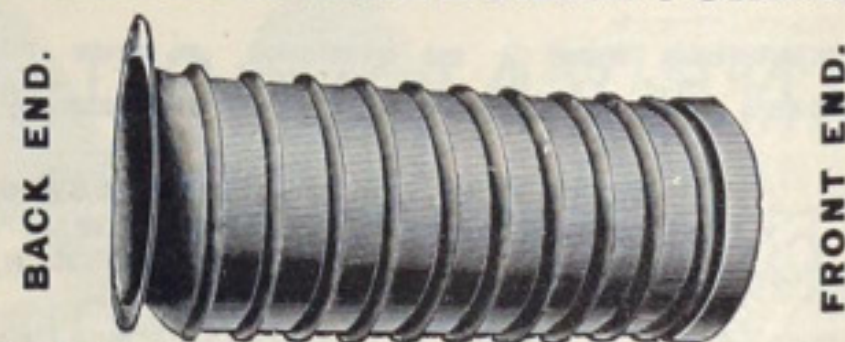
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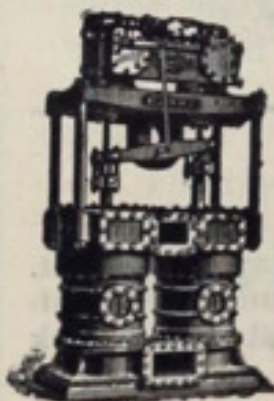
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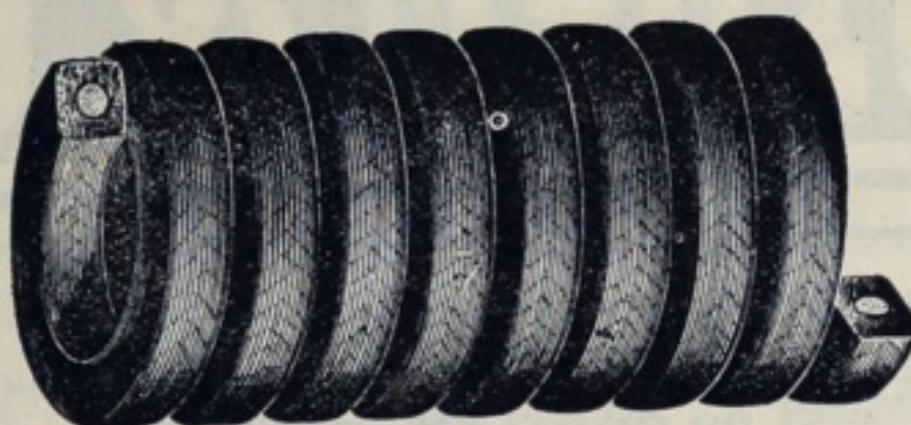


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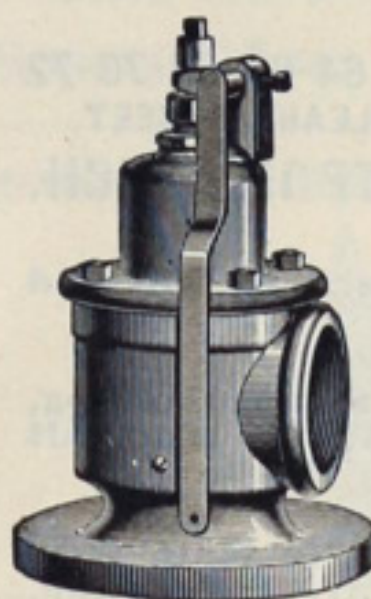
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